J.R. SIMPLOT COMPANY P.O. BOX 912 POCATELLO, IDAHO 83204
(208) 232-6620 PLANT

AgriBusiness

CERTIFIED MAIL 7004 2510 0000 0529 1923

c: Dan (2)
PRO.
Kevin

June 28, 2006

P-060317
T1-060318

Mr. Dan Pitman
Air Quality Permits Coordinator
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706

RE: J.R. Simplot Company, Don Plant – Tier I Operating Permit No. T1-040313
#300 Sulfuric Acid Plant Permit to Construct Modifications – Re-application

Dear Mr. Pitman:

Enclosed please find a permit modification request for the #300 Sulfuric Acid Plant Permit to Construct (PTC) No. 077-00006. The enclosed application addresses two modifications. Those modifications are:

1. Remove the throughput restriction in the current permit.

   This application replaces the October 2005 application and addresses the issues raised by the Idaho Department of Environmental Quality on the previous application.

   The current PTC limits the production rate of the #300 Sulfuric Acid Plant to 1750 tons per day. Through performance testing Simplot has found that the actual emissions are significantly below the limits established in the PTC. Because of this the plant is capable of operating at higher throughput rates while remaining below the established emission limits. The increased production will not affect emissions of other processes at the facility.

2. Remove Permit Condition 16.7.2 from the current Tier I Operating Permit and the corresponding permit condition in the underlying Permit to Construct issued June 16, 2001.

   Permit Condition 16.7.2 pertains to visible fugitive emissions observed leaving the property boundaries. DEQ has stated that fugitive emissions are adequately addressed in Permit Conditions 2.1, 2.2, 2.3, and 2.4 of the Tier I Operating Permit.

Fee received 7/19/06

RECEIVED
JUN 30 2006
Department of Environmental Quality
State Air Program

The requested modifications will not trigger PSD permitting requirements or cause or significantly contribute to a violation of an ambient air quality standard.

If you have any questions as you process our request please call me at (208) 234-5470 or Bob Willey at (208) 234-5352.

Sincerely,

Leon C. Pruett
EH&S Manager
J.R. Simplot Company
Don Plant

# CERTIFICATION STATEMENT - 300 Sulfuric – Permit Modification Application – June 2006

## FACILITY INFORMATION

**Facility/Permittee Name:** J.R. Simplot Company – Don Plant

**Facility Location:** 1150 W. Highway 30, Pocatello, Idaho

**AIRS Facility No.:** 077-00006

**Facility Contact:** Leon C. Pruett **Ph:** 208-234-5470 **Fax:** 208-234-5305

## PERMIT INFORMATION

**Tier I Operating Permit No.:** T1-040313 **Issuance Date:** 11/08/2005

**Certification of Truth, Accuracy, and Completeness** (by Responsible Official)

I hereby certify that based on information and belief formed after reasonable inquiry, the statements and information contained in this and any attached and/or referenced document(s) are true, accurate, and complete in accordance with IDAPA 58.01.01.123-124.

| *Responsible Official Signature* | *Responsible Official Title* | *Date* |
|---|---|---|
| | Plant Manager | 6-27-06 |

Del Butler
*Print or Type Responsible Official Name*

J.R. SIMPLOT COMPANY

DON PLANT

PERMIT MODIFICATION

NO. 1

**300 SULFURIC ACID PLANT**

**THROUGHPUT**

June 28, 2006

# Simplot Agribusiness DON Plant

PO Box 912
Pocatello, Idaho 83201

# Air Quality Permit to Construct Application for a production increase at the #300 Sulfuric Acid Plant

Prepared By:
CENTRA Consulting
300 Appaloosa Street
Boise, Idaho 83709

June 28, 2006

CENTRA
consulting inc

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## 1. EXECUTIVE SUMMARY

Simplot Agribusiness (Simplot) was issued a permit to construct (PTC) in June 2001 for modifications to the #300 Sulfuric Acid Plant. The PTC limited the production rate to 1750 tons per day based on the estimated emissions. After the modifications were completed Simplot conducted an initial performance test and found that the actual emissions were significantly below the limits established in the PTC. Subsequent performance tests have continued to show that the actual emissions are below the original estimated emissions.

Simplot anticipates that the plant may produce up to 2000 tons per day of sulfuric acid and remain in compliance with the existing emission limits. Currently there is a production limit of 1750 tons per day. This production restriction was placed on the facility in 2001. Prior to that, no such restriction existed. An increase in the production rate to 2000 tons per day results in a potential annual increase of 91,250 tons of sulfuric acid produced. Simplot estimates that between 30,000 to 60,000 tons per year of the additional sulfuric acid produced could be used in other processes throughout the facility. This estimate is consistent with amounts of sulfuric acid that have been purchased in the past to make up for short falls in sulfuric acid as stated in Section 4 – Other Increases (e.g. Simplot purchased approximately 50,489 tons of sulfuric acid for use as feedstock in other processes in 1999). An increase in the allowable production rate of sulfuric acid will allow Simplot to produce additional sulfuric acid to react to market demands for other products rather than having to purchase the additional sulfuric acid to support production. An increase in the allowable sulfuric acid production rate will not result in increases in the production rates of any other processes above what they would otherwise produce. However, if only 60,000 tons of the additional sulfuric acid produced is used in other processes at the facility, then what will be done with the remaining potential 31,250 tons of additional sulfuric acid that could be produced?

Market demand will largely drive whether or not the full increased potential will be realized. The increased production rate will allow JR Simplot Company to take advantage of increased market demand for sulfuric acid without having to curtail production of other materials thereby enhancing the company's ability to compete. In addition, the increase in production rate will allow Simplot to utilize the excess production capacity to catch up on product manufacturing more quickly after shutdown periods which will save the company time and money.

Simplot is requesting that the production limitation be removed from the permit and that compliance be determined through periodic source testing and monthly emission calculations for the pollutants of concern, specifically $NO_X$ and $SO_2$. In addition, the CEMS for $SO_2$ will continue to be used to determine the $SO_2$ emission rate. Simplot is not requesting to change the current permitted emission limits for any pollutant except for $NO_X$ emissions. Simplot is requesting to reduce the allowable $NO_X$ emission rate from 64 T/yr to 58 T/yr.

The DON Plant is a designated facility and is a major source of particulate matter ($PM_{10}$), sulfur dioxide ($SO_2$), and nitrogen oxides ($NO_X$). Increasing the production rate will not trigger PSD applicability. There will not be a significant net increase in emissions from the facility. This change will not cause emission increases anywhere else in the facility.

Simplot requests that the permit be processed in accordance with IDAPA 58.01.01.209.05.c and that the existing Title V Operating Permit be administratively amended to incorporate the PTC requirements upon issuance of the PTC.

## 2. PROJECT/PROCESS DESCRIPTION

The #300 sulfuric acid plant produces sulfuric acid using a single contact process to burn elemental sulfur. The elemental sulfur is oxidized (burned) to produce sulfur dioxide ($SO_2$). The $SO_2$ is then cooled through a waste-heat boiler and reacted with oxygen in a multipass, four-bed catalytic converter to form sulfur trioxide ($SO_3$). The $SO_3$ is then sent to an absorber tower where it is absorbed into a sulfuric acid solution. The only significant source of emissions is from the absorbing tower. The emissions are controlled with a DynaWave Reverse Jet Scrubber and a packed-bed ammonia scrubber.

## 3. EMISSIONS

### 3.1 Baseline Emissions

The baseline emission rates were documented in the November 10, 2000 permit to construct application (attached as Appendix D) and established in the June 12, 2001 permit to construct. So long as there is no increase in emissions above the baseline, PSD will not be triggered.

- Sulfur Dioxide

  For the two years preceding the installation of the DynaWave Reverse Jet Scrubber the $SO_2$ emission rate averaged approximately 797 T/yr as is shown in the PTC application dated November 10, 2000, and based on 1998 and 1999 emission data. The June 15, 2000 permit established a new emission limit of 750 T/yr, a 47 T/yr decrease.

- Ammonia

  The baseline for ammonia was set at 2.5 pounds per hour and 11 tons per year. Simplot expects that the ammonia emissions will remain below the 2.5 pounds per hour baseline. The emission rate of 2.5 pounds per hour came from historic source testing and is the highest value observed. Recent tests show that ammonia emissions are well below the allowable emission limit.

- Acid mist

  The acid mist emissions had a baseline set at 3 pounds per hour and 13 tons per year, based on an emission factor of 0.041 lb/T. Based on source test information Simplot expects acid mist emissions to remain at or below the baseline.

- $PM_{10}$

  The permit does not establish a $PM_{10}$ baseline emissions rate. A $PM_{10}$ emission limit was to be established as directed by the Compliance Agreement and Voluntary Order issued on April 21, 2004.

- Nitrogen Oxides

  The baseline emission rate for $NO_X$ was established at 27 T/yr prior to the addition of the DynaWave Reverse Jet Scrubber. After the installation the allowable $NO_X$ emissions were set at 64 T/yr based on a worst case emission factor of 0.2 lb/ton, a 37 ton per year increase, which is less than the PSD trigger of 40 T/yr.

3.2 Actual and Proposed Emissions

Simplot is requesting that the current allowable emission limits remain the same, with the exception of the allowable $NO_X$ emission rate. Simplot is requesting that the allowable $NO_X$ emission rate be reduced from 64 T/yr to 58 T/yr. Source testing shows that even with an increase to the allowable production rate limit, the emission rates will be below current permitted levels which were established to remain below PSD triggering levels.

- Ammonia

  As stated previously, ammonia emissions will not increase above the current permitted level. There are no PSD concerns for this pollutant as emissions will remain in compliance with current applicable standards and requirements.

- $PM_{10}$

  Based on the current Tier I Operating Permit a $PM_{10}$ emission rate was to be determined through a source test. A test was conducted and documented in a report dated 12/9/02. A Compliance Agreement and Voluntary Order issued on April 21, 2004 specified how a $PM_{10}$ emission rate would be established. The Order states that *"The hourly PM10 RACT emissions limit (pounds per hour) for the No. 300 sulfuric acid plant shall be set by conducting five performance tests on the sulfuric acid plant stack. The limit will be determined based on the 95% confidence interval: limit = average of five*

*tests plus 1.96 times the standard deviation of the five tests. The annual PM10 RACT limit (tons per year) shall be set by multiplying the pound per hour RACT limit by 8760 hours per year and dividing by 2000 pounds per ton. The first performance test shall be conducted prior to December 30, 2004, and tests shall be conducted annually thereafter. The sum of the emissions measured from Method 5 and 202 shall be considered PM10."* Emissions tests for particulate matter were conducted in 2004 and 2005. A summary of the source testing data is included in Appendix A.

Simplot used the 2004 and 2005 $PM_{10}$ emissions test data to estimate the baseline $PM_{10}$ emission rate for the #300 Sulfuric Acid Plant. The 2004 and 2005 test data result in the highest two year average $PM_{10}$ emissions in the previous 10 years. The $PM_{10}$ baseline is 35.78 T/yr (see the attached spreadsheet in Appendix B).

The emissions data from 2005 was used to calculate a conservative $PM_{10}$ emission factor. The measured emission rate of 9.82 pounds per hour was divided by the production rate of 72.59 tons per hour, resulting in a $PM_{10}$ emission factor of 0.135 pounds of $PM_{10}$ per ton of sulfuric acid produced. The emission factor was then used to estimate the maximum hourly $PM_{10}$ emission rate based on a production rate of 2000 T/day of sulfuric acid. The resulting estimated $PM_{10}$ emission rates are 11.25 lb/hr and 49.28 T/yr. This equals a conservative potential $PM_{10}$ emissions increase of 13.5 T/yr, which is below the significant emissions increase level of 15 T/yr. Therefore, PSD is not triggered as a result of the potential $PM_{10}$ emissions increase.

- Acid Mist

Acid mist emissions were estimated based on an emission factor of 0.041 pounds of acid mist per ton of sulfuric acid produced. Recent source testing information shows that the actual emission rate of acid mist has not exceeded 0.02 lb/T. Therefore, using a conservative emission factor of 0.036 pounds of acid mist per ton of sulfuric acid produced demonstrates that the emissions of acid mist will not exceed the permitted limits of 13 T/yr and 3 lb/hr at the higher allowable production rate.

- Sulfur Dioxide

Source testing over the past four years shows that the actual $SO_2$ emissions are significantly below the predicted emission rate established prior to the installation of the DynaWave Reverse Jet Scrubber as well as the current permitted emission rate. A summary of the source testing data is included in Appendix A. The previous permit established a reduction in $SO_2$ emissions of 47 T/yr (797 T/yr baseline -750 T/yr allowable). The current actual emission rate of $SO_2$ is 129 lb/hr and 565 T/yr (based on the source test data), therefore,

the actual decrease in emissions from the baseline of 797 T/yr is 232 T/yr. While it is possible that actual emissions of $SO_2$ may increase, the emissions will remain below the current allowable emissions rate and there will still be a decrease in emissions from the baseline emissions rate. Because the $SO_2$ emissions will remain below the baseline rate PSD is not triggered. In addition, there have been no increases in $SO_2$ emissions anywhere at the facility since the issuance of the June 12, 2001 PTC.

- Nitrogen Oxides

  Actual emissions of $NO_X$ could potentially increase as a result of a production rate increase, however, estimates show that any potential increase will still be below the permitted emission limit. The existing permit limits $NO_X$ emissions to levels that do not trigger PSD. Therefore, so long as the actual emissions of $NO_X$ do not exceed existing permit levels then PSD will not be triggered. The previous four years of source test data show that the actual emission rate of $NO_X$ is below the permitted emission rate. Based on source testing data the $NO_X$ emissions will continue to be below the current allowable levels. The original emission factor used for estimating $NO_X$ emissions was 0.2 pounds of $NO_X$ per ton of sulfuric acid produced. Upon review of several years of source test data it appears that this emission factor has over estimated $NO_X$ emissions. The $NO_X$ emissions can vary, and a conservative emission factor of 0.16 pounds of $NO_X$ per ton of sulfuric acid produced demonstrates that no limits will be exceeded. Using the emission factor of 0.16 lb/T results in a predicted emission rate of 58 T/yr of $NO_X$ emissions. Therefore, Simplot is requesting that the allowable $NO_X$ emissions rate be reduced from 64 T/yr to 58 T/yr.

  PSD will not be triggered for $NO_X$ because the difference between the baseline emission rate and the proposed emission rate is below the significant increase level of 40 T/yr. There have been no increases in $NO_X$ emissions anywhere in the plant since the issuance of the June 15, 2001 PTC.

Below is a table showing the existing baseline emission rates, the current permitted emission rates, the current actual emissions rates, and the requested allowable emission rates.

**Table 3.1**: *Comparison of baseline emissions, permitted emissions, current actual emissions, and requested allowable emissions.*

| Pollutant | Baseline Emission Rate | | Current Permitted Emission Rate | | Current Actual Emission Rate | | Requested Allowable Emission Rate | |
|---|---|---|---|---|---|---|---|---|
| $SO_2$ | | 797 T/yr | 170 lb/hr | 750 T/yr | 129 lb/hr | 565 T/yr | 170 lb/hr | 750 T/yr |
| $H_2SO_4$ mist | | 6.4 T/yr | 3 lb/hr | 13 T/yr | 1.2 lb/hr | 6.4 T/yr | 3 lb/hr | 13 T/yr |
| Ammonia | 2.5 lb/hr | 11 T/yr | 2.5 lb/hr | 11 T/yr | 0.1 lb/hr | 0.44 T/yr | 2.5 lb/hr | 11 T/yr |
| $NO_X$ | | 27 T/yr | | 64 T/yr | | 21 T/yr | | 58 T/yr |
| $PM_{10}$ | 8.2 lb/hr | 35.8 T/yr | n/a | n/a | 8.2 lb/hr | 35.8 T/yr | 11.3 lb/hr | 49.3 T/yr |

Table 3.2 shows the difference between the baseline and the requested allowable emission rates for $SO_2$, $NO_X$, and $PM_{10}$.

**Table 3.2**: *Emission changes for $SO_2$, $NO_X$ and $PM_{10}$.*

| Pollutant | Baseline to Permitted Emissions Change |
|---|---|
| $SO_2$ | 47 T/yr decrease |
| $NO_X$ | 31 T/yr increase |
| $PM_{10}$ | 13.5 T/yr increase |

As is shown in Table 3.2 any changes to the potential to emit are still less than significant when compared to the baseline emissions and the change due to the increase in the production rate. Therefore, this project does not trigger PSD permitting requirements.

Emissions estimates are included in Appendix B.

4. OTHER INCREASES

Other processes at the facility utilize sulfuric acid to make additional products. Increasing the allowable production rate of sulfuric acid in the #300 sulfuric acid plant raises the question as to whether there could be an increase in the potential to emit of other processes at the facility. As previously explained, in the past, when the market demands, Simplot has purchased sulfuric acid to make up for shortfalls in the amount of sulfuric acid necessary to produce additional products. In 1998 Simplot purchased approximately 42,185 tons of additional sulfuric acid, and in 1999 Simplot purchased approximately 50,489 tons. As recently as 2004 Simplot purchased approximately 2,642 tons of sulfuric acid and thus far in fiscal year 2006 Simplot has purchased approximately 24,090 tons of sulfuric acid for use in other processes at the plant. The fiscal year runs from September 1, 2005 through August 31, 2006. Therefore, because the facility has made up for shortfalls in sulfuric acid supply by purchasing additional sulfuric acid when needed, the other processes at the facility that require sulfuric acid are not dependent on the production capacity of the #300 sulfuric acid plant. The potential to emit of the other processes remain unchanged with an increase in the allowable production rate of sulfuric acid. The production rate increase will allow Simplot to reduce the amount of sulfuric

acid that they purchase, but will not affect the production rate of any other process at the facility.

## 5. AMBIENT IMPACTS

Ambient impacts for only $PM_{10}$ emissions have been evaluated. No emission increases from existing permitted levels are being requested for any other pollutants. Therefore, all pollutants other than $PM_{10}$ have already been shown to be in compliance with all applicable ambient air quality standards.

### *$PM_{10}$ Ambient Impact*

Simplot submitted an AERMOD modeling analysis as part of the November 10, 2000 permit to construct application (Appendix D). The previous modeling analysis is used to determine "ambient impact factors" for $PM_{10}$ emissions for all appropriate averaging periods. The "ambient impact factors" can then be used to determine the impacts from the #300 Sulfuric Acid Plant at any emission rate.

The "ambient impact factors" are used to determine the ambient impacts due to the baseline emission rate established from the 2004 and 2005 emissions testing as well as impacts due to the post project $PM_{10}$ emissions. The difference between the impact due to the baseline emissions and the impact due to the post project emissions is then compared to the significant contribution level (SCL) to determine if additional modeling is required. This approach is justified because an increase in only the $PM_{10}$ emission rate is being analyzed, the emission source has not and will not change, and there is only one emission point included in the analysis.

The "ambient impact factors" for $PM_{10}$ emissions are determined by dividing the $PM_{10}$ impacts by the $PM_{10}$ emission rate from the 11/10/2000 analysis for both the 24-hr and annual averaging periods. The estimated baseline ambient impacts are determined by multiplying the baseline emission rate (calculated from the 2004/2005 source test data) by the appropriate "ambient impact factor." The ambient impacts as a result of potential $PM_{10}$ emission increases due to the proposed project are determined by multiplying the post project $PM_{10}$ emission rates by the appropriate "ambient impact factor" and subtracting the baseline impacts. The following are example calculations for the 24-hour averaging period:

| | |
|---|---|
| Ambient impact factor: | $(2\ \mu g/m^3) / (4\ lb/hr) = 0.5\ \mu g\text{-}hr/m^3\text{-}lb$ |
| Baseline ambient impact: | $(8.17\ lb/hr)^* (0.5\ \mu g\text{-}hr/m^3\text{-}lb) = 4.09 \mu g/m^3$ |
| Post project impact: | $(11.25\ lb/hr)^* (0.5\ \mu g\text{-}hr/m^3\text{-}lb) = 5.63 \mu g/m^3$ |
| Post project impact increase: | $(5.63 \mu g/m^3)-( 4.09 \mu g/m^3) = 1.54 \mu g/m^3$ |

Where: $2\ \mu g/m^3$ is the modeled impact from the 11/10/2000 analysis;
4 lb/hr is the modeled $PM_{10}$ emission rate in the 11/10/2000 analysis;
$0.5\ \mu g\text{-}hr/m^3\text{-}lb$ is the "ambient impact factor"

8.17 lb/hr is the baseline emission rate calculated using the 2004 and 2005 test data; and
11.25 lb/hr is the potential emissions as a result of the proposed project.

While the impacts based on the potential to emit of the proposed project are included in the analysis, only the potential increase in $PM_{10}$ emissions is required to be analyzed to determine if additional modeling is required. The resulting impact due to the increase in emissions is compared to the SCL. If the impact due to the increase in emissions as a result of the proposed project is below the SCL no further analysis is required. The impacts as a result of the potential $PM_{10}$ emissions increase are 1.54 $\mu g/m^3$, 24-hr average and 0.08 $\mu g/m^3$, annual average. These impacts are below the SCL's for $PM_{10}$ of 5 $\mu g/m^3$, 24-hr average and 1 $\mu g/m^3$, annual average and no further modeling is required. Therefore, the conservative potential increase in $PM_{10}$ emissions from the project will not cause or significantly contribute to a violation of an ambient air quality standard.

The ambient impact analysis is included as Appendix C

## 6. PROPOSED PERMIT CONDITIONS

Simplot is requesting that the current production limit be removed from the permit. To determine compliance with pollutant emission limits, specifically $NO_X$ and $SO_2$, Simplot will monitor the production rate and utilize the latest compliance test information to calculate the emission rates on a monthly basis. Simplot will continue to conduct periodic compliance tests as required in the permit. In addition, the CEMS for $SO_2$ will continue to be used to determine the $SO_2$ emission rate. No other changes are proposed.

The proposed modification will allow JR Simplot Company to operate more efficiently and take advantage of varying market conditions while still complying with existing permit limits. An increase in the allowable production rate will not impact the production rates of other processes at the facility. It will simply allow Simplot to manufacture and utilize its own sulfuric acid instead of having to purchase additional sulfuric acid and to sell excess product (sulfuric acid) directly on the open market.

## 7. CERTIFICATION

I hereby certify that based upon information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

| | |
|---|---|
| Del Butler | Plant Manager |
| Responsible Official | Title |
| Del Butler | 6-27-06 |
| Signature | Date |

# Appendix A

## COMPLIANCE TESTING SUMMARY

**300 Sulfuric Acid Plant**
**Test data & Production**

by Bowman

| Year & Date Tested | Emission SO2 #/hour | Emission SO2 #/ton | Emission ppm SO2 | Emission SO3/Mist #/hour | Emission SO3/Mist #/ton | Emission ppm SO3/mist | Emission NOx #/ton | Emission NOx ppm | Emission NH3 #/hour | Emission PM10 #/hour | Production Tons/hr | Stack Temp °F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/10 thru 12/2005 | 94.4 | 1.3 | 137.9 | 0.42 | 0.0057 | 0.49 | 0.066 | 8.9 | 0.09 | 9.82 | 72.59 | 87.1 |
| 8/31 thru 9/3/2004 | 78.2 | 1.1 | 119.2 | 0.93 | 0.013 | 1.14 | 0.068 | 9.1 | 0.053 | 6.52 | 71.32 | 86.1 |
| 11/13/2003 | 79.9 | 1.11 | 120.3 | 0.79 | 0.01 | 0.8 | not tested for | not tested for | not tested for | not tested for | 72 | 85.9 |
| 11/4 thru 6/2003 | 104 | 1.44 | 153.1 | 0.44 | 0.01 | 0.4 | 0.064 | 8.4 | 0.108 | 2.87 | 72.0 | 85.7 |
| 11/6 thru 7/2002 | 92.8 | 1.19 | 117.4 | 1.23 | 0.02 | 1.2 | 0.065 | 8 | 0.039 | 1.89 | 70 | 93.1 |
| 10/10-12/2001 | 129 | 1.65 | 155.2 | 0.61 | 0.0078 | 0.56 | 0.052 | 6.9 | 0.0069 | 2.027 | 73.3 | 90 |
| 11/8/2000 | 185 | 2.7 | 212 | 1.78 | 0.027 | not calculated | not tested for | not tested for | not tested for | not tested for | 68.1 | 84 |
| 8/10/1999 | 216 | 3.3 | 253.4 | 1.86 | 0.029 | not calculated | not tested for | not tested for | not tested for | not tested for | 65.1 | 85.3 |
| 4/28/1998 | 203.4 | 3.77 | 273 | 1.25 | 0.023 | not calculated | not tested for | not tested for | not tested for | not tested for | 54 | 92 |
| 6/5/1998 | | | | | | | 0.111 | not calculated | not tested for | not tested for | 41 | 85 |
| 8/27 & 9/9/1997 | 209.6 | 3.3 | 266 | 2.93 | 0.047 | not calculated | not tested for | not tested for | not tested for | not tested for | 62.9 | 92 |
| 11/12 & 13/1996 | 187.2 | 2.83 | 279 | 0.848 | 0.013 | not calculated | not tested for | not tested for | not tested for | not tested for | 66.3 | 86.9 |
| 8/30 & 31/1995 | 226.6 | 3.5 | 305.7 | 1.1 | 0.017 | not calculated | not tested for | not tested for | not tested for | not tested for | 64.4 | 85.2 |

# Appendix B

## EMISSION CALCULATIONS

# Simplot Agribusiness
# #300 Sulfuric Acid Plant
# Production Rate Increase
# Emission Estimates

| | Current Allowable | Future Maximum |
|---|---|---|
| Throughput (T/Day) | 1750 | 2000 |

| Pollutant | New EF[1] | Current Actual Emissions (Lb/hr) | Current Actual Emissions (T/yr) | Projected Future Actual Emissions (Lb/hr) | Projected Future Actual Emissions (T/yr) | Baseline Emissions (From 2001 PTC, 98-99 data) | Current Permitted Emissions (T/yr) | Requested Allowable Emissions (T/yr) | Baseline to Permitted Delta[3] (T/yr) | Significant Increase (T/yr) | PSD Triggered?[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $SO_2$ | Unchanged | 129 | 565 | 137.50 | 602 | 797 | 750 | 750 | -47 | 40 | N |
| $H_2SO_4$ mist | 0.04 lb/T | 2.63 | 11 | 3.00 | 13 | 6.4 | 13.0 | 13.0 | 6.60 | 7 | N |
| $NH_3$ | Unchanged | 2.5 | 11 | 2.5 | 11 | 11 | 11 | 11 | 0 | n/a | N |
| $NO_X$[2] | 0.16 lb/T | | 21 | | 58 | 27 | 64 | 58 | 37 | 40 | N |
| $PM_{10}$ | 0.14 lb/T | 8.17 | 36 | 11.25 | 49 | N/A | N/A | 49 | 13 | 15 | N |

1. The "new" emission factors have been established based on the worst case source test information since the issuance of the PTC on June 15, 2001.
2. The current actual is based on source testing. The worst case $NO_X$ emission rate was 4.85 lb/hr which equals 21 T/yr. Projected actual based on worst case emission factor of 0.16 lb/T. Actual source test data shows emission rates to be lower.
3. For $PM_{10}$ the delta is between Current Actual and Future Actual (Potential) Emissions since there is no current allowable or permitted emission rates.
4. The comparison is between the "Baseline to Permitted Delta" and the "Significant increase."

# Appendix C

## $PM_{10}$ AMBIENT IMPACTS

# Simplot Agribusiness
# #300 Sulfuric Acid Plant
# Production Rate Increase
# $PM_{10}$ Ambient Impacts

| Timeframe | Emission Rate | | Ambient Impact[2] µg/m³ | | SCL µg/m³ | | Exceeds SCL?[3] | Ambient Impact Factor µg-hr/m³-lb | |
|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | T/yr | 24-hr | annual | 24-hr | Annual | | 24-hr | Annual |
| 11/10/2000 Application | 4 | 17.7 | 2.00 | 0.11 | 5 | 1 | N | 0.5 | 0.006 |
| 2004/2005 Source Test Baseline | 8.17 | 35.78 | 4.09 | 0.22 | 5 | 1 | N | | |
| Projected Actual/Potential | 11.25 | 49.28 | 5.63 | 0.31 | 5 | 1 | Y | | |
| Difference between baseline and potential[1] | 3.08 | 13.49 | 1.54 | 0.08 | 5 | 1 | N | | |

1. The impact due to the increase in emissions (i.e. the difference between baseline and potential) is what is compared to the SCL to determine if additional modeling is required.
2. Since there have been no changes to the source, all ambient impacts are based on the modeling results in the 11/10/2000 permit to construct application.
3. SCL = Significant Contribution Level

# Appendix D

## NOVEMBER 10, 2000
## PERMIT TO CONSTRUCT APPLICATION

# SIMPLOT AGRIBUSINESS DON PLANT

## 300 Sulfuric Acid Plant Restoration Project

## Permit To Construct Application

NOVEMBER 10, 2000

*Prepared by:*

**MFG, INC.**
19203 36th Avenue West, Suite 101
Lynnwood, Washington 98036
(425) 921-4000 telephone
(425) 921-4040 facsimile

Jul 27 05 05:40p p.1

# Simplot Don Plant 300 Sulfuric Acid Plant Restoration Project
## Permit-to-Construct Application

### Introduction

Simplot Agribusiness (Simplot) manufactures nitrogen, phosphate, and sulfate commercial products at its Don Plant facility located near Pocatello, Idaho. Simplot requests a Permit-to-Construct (PTC) to restore its 300 sulfuric acid plant (hereafter, #3) to ensure safe and reliable operation. This project would not increase the plant's design capacity of 1,750 tons of sulfuric acid per day. As discussed in the following sections, actual emissions are not expected to increase. To allow for uncertainties after the modification, however, Simplot has proposed allowable emissions that represent increased potential emissions.

With this application, Simplot seeks approval to commence construction in accordance with IDAPA 58.01.01.213. This application conforms to IDAPA 58.01.01.213 and the "15-Day Pre-Permit Construction Approval Guidelines Document", dated April 1998.

The Don Plant is a designated facility with respect to Prevention of Significant Deterioration (PSD) regulations. The plant is a major source of particulate matter (PM10), sulfur dioxide (SO2), and nitrogen dioxide (NO2). However, plant-wide emissions associated with the restoration project will either decrease or result in increases that are less than the thresholds that trigger PSD applicability. Therefore, the Restoration Project is a minor modification to a major facility. The Pocatello area is a nonattainment area for PM10 but is attainment or unclassifiable for all other criteria pollutants.

Simplot requests that the Idaho Department of Environmental Quality (DEQ) grant a PTC for the Restoration Project. Furthermore, Simplot requests that "pre-permit" construction approval be granted within 15 days of this application, pursuant to IDAPA 58.01.01.213. A copy of the newspaper notice of the required public meeting is provided in Appendix A. The required public meeting will be held November 22, 2000.

### Existing Plant Description

Figure 1 provides a plan map of the Don Plant. #3 is located in the northwest corner of the Don Plant site.

#3 manufacturers sulfuric acid using the single contact process to burn elemental sulfur. The contact process incorporates 3 basic operations, each of which corresponds to a distinct chemical reaction. First, the sulfur in the elemental sulfur feedstock is oxidized (burned) to sulfur dioxide ($SO_2$). The resulting sulfur dioxide is fed to a converter, where it is catalytically oxidized to sulfur trioxide ($SO_3$). Finally, the sulfur trioxide is absorbed in a 93 percent sulfuric acid solution.



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Figure 2 is a schematic diagram of a single absorption contact process sulfuric acid plant that burns elemental sulfur. The sulfur is burned in clean air that has been dried by scrubbing with 93 to 99 percent sulfuric acid. The gases from the combustion chamber cool by passing through a waste heat boiler and then enter the catalytic converter. Usually, 95 to 98 percent of the sulfur dioxide from the combustion chamber is converted to sulfur trioxide, with an accompanying large evolution of heat. After being cooled, again by generating steam, the converter exit gas enters an absorption tower. The absorption tower is a packed column where acid is sprayed in the top and where the sulfur trioxide enters from the bottom. The sulfur trioxide combines with the water in the acid and forms more sulfuric acid.

Nearly all sulfur dioxide emissions from sulfuric acid plants are found in the exit stack gases. In addition to exit gases, small quantities of sulfur oxides are emitted from storage tank vents and tank car and tank truck vents during loading operations and through leaks in process equipment. Few data are available on the quantity of emissions from these sources.

## Project Description

### Facility and Process Description

The scope of the project is the replacement of aging process equipment. At #3, Simplot proposes to replace the following equipment in 2001: the converter, drying tower, 98% pump tank, #2 Superheater, two boiler feed water pumps, scrubber packing, scrubber demister mesh pad and scrubber mist eliminators (Brownian diffusion candles).

A second scrubber stage will be added to the existing packed bed ammonia scrubber to further reduce SO2 emissions. This new scrubbing stage will employ reverse jet "Dynawave" scrubbing technology with approximately three transfer units at design conditions. DynaWave's Reverse Jet Scrubber, a wet scrubber, is an open duct in which liquid is injected counter-current to the gas through a non-restrictive injector. Liquid collides with downcoming gas to create the "Froth Zone," a region of extreme turbulence, with a high rate of liquid surface renewal. Through the balancing of the two streams' momentums, the liquid reverses directions and returns to the vessel sump for recycle back to the jet. Additional information about the proposed scrubber upgrade is available at http://www.enviro-chem.com/airpol/common/rjstop.html.

### Construction Schedule

Simplot proposes to begin final design and equipment purchase upon approval from IDEQ under IDAPA 58.01.01.213, 15 days after DEQ receives this application. Site work is expected to begin in January, and Simplot plans to complete the restoration project in July, 2001.



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## Emissions

### Current Actual Emissions

The primary pollutants associated with a sulfuric acid plant are oxides of sulfur. Although there is no fuel-bound nitrogen introduced to the oxidation chamber, oxidation of nitrogen in the combustion air generates oxides of nitrogen. Because no carbon-based fuels are used, #3 is not a source of carbon monoxide or volatile organic compounds.[1]

In compliance with the conditions of its Tier II operating permit, Simplot conducts annual source tests of SO2 and acid mist emissions from #3. Ten years of source tests are summarized in Table 1. This table reveals significant variability in SO2 and acid mist emissions. The average SO2 emission rate for the most recent two years was 210 lb/hr, or slightly higher than the ten-year average of 205 lb/hr. SO2 emission rates have varied by as much as a factor of 2 over the ten years of source tests.

The average acid mist emission rate for the most recent two years was 1.6 lb/hr, or slightly lower than the ten-year average of 1.8 lb/hr. Expressed as an emission factor, acid mist emissions for the last two years averaged 0.026 lb/ton, nearly identical to the ten year average of 0.027. However, acid mist emission rates (lb/hr) and emission factors (lb/ton) have varied by more than a factor of ten over the ten years of source tests.

As required by a 1996 Permit to Construct (077-00006), Simplot also tested NOx emissions and reported the results to DEQ in 1998. That source test revealed an emission rate of 0.11 lb NOx per ton of sulfuric acid produced.

### Potential Emissions

Pollutant emissions from #3 are not expected to change significantly as a result of the restoration. However, there is a level of unpredictability in any equipment modification. Therefore, Simplot proposes short-term emission limits for acid mist and NOx that are higher than emission rates determined by source tests of the current plant. However, Simplot also proposes annual emission limits to ensure that emission increases (potential future emissions minus current actual emissions) will not exceed the thresholds that trigger PSD. These proposed emission limits would replace the current emission limits.

SO2

With the proposed project, a second stage Ammsox scrubber would be introduced that would result in a significant reduction in sulfur dioxide (SO2). Future SO2 emissions would be reduced from the current allowed rate of 750 lb per 3-hour period to a proposed limit of 510 lb per 3-hour

[1] It should be noted that natural gas is used for a period of several days during startup to preheat the catalyst beds. Startups typically occur once or twice per year. During this time, small amounts of VOCs and CO related to the combustion of natural gas are emitted.



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## Table 1: Source Test Summary

| | Sulfur Dioxide | | Acid Mist | | |
|---|---|---|---|---|---|
| | | Average | | | Average |
| Date | lb/hr | lb/hr | lb/ton | lb/hr | lb/hr |
| 11/6/90 | 295 | | .056 | 4.0 | |
| 11/8/90 | 178 | | .041 | 2.8 | |
| 11/13/90 | 255 | 243 | .088 | 5.9 | 4.2 |
| 11/20/91 | 200 | | .010 | 0.9 | |
| 11/21/91 | 188 | | .010 | 0.7 | |
| 11/21/91 | 177 | 188 | .010 | 0.7 | 0.8 |
| 7/2/92 | 218 | | .070 | 5.0 | |
| 7/3/92 | 222 | | .050 | 3.2 | |
| 7/3/92 | 223 | 221 | .030 | 1.9 | 3.4 |
| 10/30/93 | 146 | | .010 | 0.8 | |
| 11/2/93 | 206 | | .010 | 0.8 | |
| 11/2/93 | 191 | 181 | .010 | 0.9 | 0.8 |
| 5/24/94 | 147 | | .008 | 0.6 | |
| 5/24/94 | 186 | | .012 | 0.9 | |
| 5/24/94 | 186 | 173 | .012 | 0.8 | 0.8 |
| 8/30/95 | 227 | | .020 | 1.3 | |
| 8/31/95 | 224 | | .016 | 1.0 | |
| 8/31/95 | 229 | 227 | .016 | 1.1 | 1.1 |
| 11/12/96 | 196 | | .015 | 1.0 | |
| 11/13/96 | 185 | | .012 | 0.8 | |
| 11/13/96 | 181 | 187 | .012 | 0.8 | 0.8 |
| 8/27/97 | 216 | | .029 | 1.9 | |
| 9/9/97 | 203 | 210 | .066 | 3.9 | 2.9 |
| 4/28/98 | 197 | | .018 | 1.0 | |
| 4/28/98 | 204 | | .019 | 1.0 | |
| 4/28/98 | 209 | 203 | .033 | 1.7 | 1.2 |
| 8/10/99 | 222 | | .029 | 1.9 | |
| 8/10/99 | 227 | | .029 | 1.9 | |
| 8/10/99 | 199 | 216 | .029 | 1.9 | 1.9 |
| Minimum | 146 | 173 | .008 | 0.6 | 0.8 |
| Average | 205 | 205 | .027 | 1.8 | 1.8 |
| Maximum | 295 | 243 | .088 | 5.9 | 4.2 |



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period. The future potential emission rate of 745 tons per year (tpy) would be 52 tpy lower than the baseline emission rate of 797 tpy (the average of the last two years' actual SO2 emissions) and 350 tpy lower than the current allowed level of 1,095 tpy. Simplot would continue to monitor hourly SO2 emissions using the Continuous Emission Monitor (CEM) currently used to monitor SO2 emissions.

Ammonia

The upgrade to the Ammsox scrubber would increase consumption of ammonia-based scrubber solution. Because some of the ammonia comes out of solution in the scrubber, there may be an increase in ammonia emissions from the plant. Simplot anticipates that ammonia emissions would remain less than 2.5 lb/hour, which is the highest ammonia emission rate observed in previous source tests. Because there is no significant emission rate threshold for ammonia, and because predicted concentrations of ammonia are far below Idaho Acceptable Ambient Concentrations, Simplot is not proposing specific emission limits for ammonia.

Acid mist

Emissions of acid mist (H2SO4) expressed as pounds of acid mist per ton of sulfuric acid produced are not expected to change significantly as a result of the restoration. As discussed below, federal New Source Performance Standards (NSPS) establish an emission limit of 0.15 lb/ton for sulfuric acid plants. Simplot proposes a limit of 0.041 lb/ton. This results in a proposed potential-to-emit of 13.1 tons, assuming 365 days of operation at the plant's design capacity (1,750 tons/day). The potential 6.7-tpy increase over the baseline emission rate of 6.4 tpy would be less than the 7 tpy Significant Emission Rate that constitutes a major modification.

PM10

Because ammonia is used in the scrubber solution to control SO2 emissions, some of the sulfate may be emitted as ammonium sulfate particulate matter rather than acid mist. Simplot does not know the extent of this conversion, and proposes to continue to report sulfate mass emissions as sulfuric acid. However, even if all the sulfate were to be emitted as PM10 the increase would be less than 9 tpy. No other PM10 emissions are expected from the project. As noted in Appendix C, predicted PM10 concentrations are less than the 24-hour and annual significant contribution criteria established for nonattainment areas.

NOx

There are uncertainties regarding the effect the restoration will have on NOx emissions from #3. Although a single source test in 1998 suggests that emissions would be approximately 0.11 lb/ton, there are insufficient data to enable Simplot to commit to this emission rate. Simplot will, however, commit to an emission rate of 0.20 lb/ton, which is half the current permitted limit of 0.40 lb/ton. At the expected capacity of the plant (1,750 tons per day), the potential to emit (with 365 days of operation) would be 64 tons per year. The potential 37-tpy increase over the baseline emission rate of 27 tpy would be less than the 40 tpy Significant Emission Rate that constitutes a major modification, but half the currently allowed emissions rate of 128 tpy.



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**Table 2: Comparison of Potential Annual Emissions with Actual Baseline Emissions (tons)**

| | 1998 (Actual) | 1999 (Actual) | Baseline ('98-'99 Average) | Proposed (Potential) | Change | SER | Significant Increase ? |
|---|---|---|---|---|---|---|---|
| Annual Production (tons) | 454,884 | 518,670 | 486,777 | 640,000 | | | |
| Oxides of nitrogen | 25 | 29 | 27 | 64 | 37 | 40 | No |
| Sulfur dioxide | 766 | 828 | 797 | 745 | -52* | 40 | No |
| Acid mist | 5.3 | 7.5 | 6.4 | 13.1 | 6.7 | 7 | No |
| NOx actuals based on source test emission factor (0.11 lb/ton); NOx potential based on continuous operation at 0.20 lb/ton | | | | | | | |
| SO2 actuals based on CEM data; SO2 potential based on continuous operation at 510 lb/3 hour | | | | | | | |
| Acid mist actuals based on source test emission factor; potential based on continuous operation at 0.041 lb/ton | | | | | | | |
| Fugitive SO2 emissions associated with #3 are not expected to change as a result of this project. | | | | | | | |
| * Simplot intends to request Emission Reduction Credits after completion of the restoration. | | | | | | | |

Emission Monitoring

Simplot proposes to conduct source tests annually to determine current emission factors for acid mist and NOx. Simplot will also monitor monthly production levels. These source test-based emission factors and monthly production data would be used to calculate emissions monthly and maintain a rolling 12-month emission total to ensure compliance with proposed annual mass emission limits.

## Regulatory Analysis

This section provides an overview of the applicable regulatory requirements associated with the proposed restoration of the #3. A detailed listing of applicable requirements, as required by the 15-Day Pre-Permit Construction Approval Guidelines Document, is provided as Appendix B.

### Permit to Construct

This application has been prepared to meet the intent of IDAPA 58.01.01.201, which requires that a permit-to-construct be submitted for modifications of existing air pollution sources. A similar PTC application was prepared in 1996 to address other restoration work on #3. That application resulted in PTC 077-00006. The key conditions of that PTC are:

- a maximum NOx emission rate of 0.40 lb NOx per ton of sulfuric acid produced
- a limit of 128 tons NOx per year
- a limit of 640,000 tons per year of sulfuric acid production



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## IDAPA 58.01.01.845

IDAPA 58.01.01.845 identifies rules specific to SO2 emissions from sulfuric acid plants. #3 is subject to those limits now, and would be subject after the restoration. The key criterion of this section is a limit of 28 lb SO2 per ton of sulfuric acid produced, averaged over one complete cycle of operation or 3 hours, whichever results in higher emissions. Simplot's proposed limit of 510 lb SO2 per 3-hour period is equivalent to an emission rate of approximately 2.3 lb/ton of acid produced. Thus, the proposed allowable limit would comply with this provision by a very wide margin.

### New Source Performance Standards (NSPS)

New Source Performance Standards (40 CFR 60) Subpart H applies to sulfuric acid plants that commenced construction or modification after August 17, 1971. Subpart H limits SO2 emissions to 4 lb/ton of acid produced, acid mist emissions to 0.15 lb/ton of acid produced, and opacity to 10%. It also specifies certain reporting and testing requirements. Subpart H does not currently apply to #3 because it commenced construction prior to 1971.

Modifications of a unit that is currently exempt can trigger applicability of Subpart H two ways. First, NSPS may be triggered if a modification results in an increase in hourly mass emissions (e.g., lb/hr) of pollutants governed by the relevant NSPS. This evaluation compares actual emissions at the maximum design capacity before the project to actual emissions at maximum design capacity after the project. Because only SO2 and acid mist are addressed by Subpart H, only these pollutants need to be evaluated to determine applicability by this pathway. Secondly, NSPS applicability may be triggered if the cost of a project exceeds 50 percent of the cost of a new unit.

### New Source Review

Because the Don Plant is located in an area that is designated nonattainment for PM10, provisions for nonattainment new source review apply to PM10 emission increases of 15 tpy or more. When evaluating whether an emission increase is significant, one compares future potential annual emissions (with the project) against a baseline annual emission rate. That baseline is based on the average of the annual emissions from the two most recent years of operation if those years are deemed representative of the facility's historic operations.

Simplot has no reason to believe there will be any increase in PM10 as a result of this project, but as noted in the preceding discussion of emissions, some of the sulfate emitted from the Ammsox scrubber may be emitted as ammonium sulfate particulate matter. Simplot does not know what fraction of the sulfate is emitted as sulfuric acid mist and what fraction is emitted as ammonium sulfate, but has traditionally reported sulfate emissions as sulfuric acid mist. As noted above, however, potential PM10 emissions would be less than the 15 tpy significant emission rate that triggers nonattainment new source review provisions even if all the sulfate were emitted as ammonium sulfate particulate matter.



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## Prevention of Significant Deterioration (PSD)

The Don Plant is a major source under federal PSD rules because it is a designated facility and has emissions exceeding 100 tons per year of a regulated pollutant. The project would be considered a major modification if it resulted in emission increases that exceed pollutant-specific significance levels. When evaluating the applicability of PSD, the same procedure used to consider nonattainment new source review is applied: future potential annual emissions (with the project) are compared with a baseline annual emission rate. That baseline is derived from the average of the annual emissions from the two most recent years of operation if those years are deemed representative of the facility's historic operations. Table 2 presents a comparison of future potential emissions with the average actual emissions from #3.

Only emissions of NOx, acid mist and ammonia may increase as a result of the Restoration Project. IDAPA 58.01.01.006 (92) does not identify a significant emission rate for ammonia. Emissions of ammonia from the scrubber are addressed below, where Idaho's toxic air pollutant regulation is discussed.

Actual emissions of NOx and acid mist are expected to remain unchanged, but potential emissions are higher because Simplot is requesting an emission limit higher than current actual emission factors (determined from source testing) to allow for possible unforeseen effects of the restoration. Simplot proposes permit conditions limiting annual NOx and acid mist emissions such that the increases attributable to the Restoration Project would not trigger PSD. Simplot proposes to calculate NOx and acid mist emissions monthly to ensure that 12-month total emissions do not exceed the proposed emission limits.

### Toxic Air Pollutants

IDAPA 58.01.01.585 identifies acceptable ambient concentrations (AAC) for non-carcinogenic toxic air pollutants. Table 3 identifies relevant information for ammonia and sulfuric acid (acid mist), which are designated toxic air pollutants by this regulation.

**Table 3: Toxic Air Pollutants**

| Compound | CAS Number | OEL (mg/m3) | EL (lb/hr) | AAC (mg/m3) | Restoration Project Emissions (lb/hr) |
|---|---|---|---|---|---|
| Ammonia | 7664-41-7 | 18 | 1.2 | 0.9 | 2.5 |
| Sulfuric Acid Mist | 7664-93-9 | 1 | 0.067 | 0.05 | 3 |

OEL = Occupational Exposure Level
EL = Screening Emission Level
AAC = Acceptable Ambient Concentration



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Table 3 indicates proposed emissions of ammonia and sulfuric acid mist exceed the screening emission levels established by IDAPA 58.01.01.585. Therefore, these pollutants were evaluated using an EPA dispersion model. As noted below, the calculated maximum ambient concentrations of ammonia and acid mist are less than the Acceptable Ambient Concentrations cited in IDAPA 58.01.01.585.

**Ambient Air Quality Assessment**

To satisfy the requirements of IDAPA 58.01.01.213, MFG conducted a dispersion modeling analysis of the Restoration Project. The project would result in an overall reduction in emissions of SO2, therefore SO2 modeling was not performed. Increases in potential emissions of NOx, acid mist, and ammonia are possible. Consistent with telephone guidance from DEQ's Ken Hanna on October 26, 1999 regarding a similar assessment for a different permit-to-construct, MFG assessed only pollutants whose emissions would increase as a result of the modification.

MFG assessed emissions from the restored #3 by comparing predictions from the AERMOD model with relevant regulatory criteria. The dispersion modeling analysis used a three-year meteorological database, a receptor grid mesh size of 250-m, receptors inside FMC's neighboring site, terrain elevations from USGS quadrangles, and modeling assumptions appropriate for the land use surrounding the facility.

The results of the dispersion modeling are summarized in Table 4 where the maximum concentrations from increased emissions from #3 are compared to EPA Significant Impact Levels (SILs) and IDEQ Acceptable Ambient Concentrations for toxic air pollutants. Our analysis indicates total proposed NOx emissions associated with #3 would result in concentrations less than EPA SILs. Consequently, the assessment of cumulative concentrations using assumed background concentrations is not warranted.

PM10 concentrations were predicted based on the extreme assumption that all sulfate is emitted as PM10 rather than acid mist. Predicted PM10 concentrations are less than the 24-hour and annual average concentrations that constitute a Significant Contribution as defined by IDAPA 58.01.01.006 (93).

Predicted concentrations based on total proposed acid mist and ammonia emissions were also found to be insignificant and less than DEQ's Acceptable Ambient Concentrations.

The details of the modeling analysis are provided as Appendix C.



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**Table 4. Comparison of Maximum Predicted Concentrations with Ambient Air Screening Criteria**

| Pollutant | Averaging Period | #3 Maximum ($\mu g/m^3$) (1) | Screening Criteria ($\mu g/m^3$) |
|---|---|---|---|
| NO2 | Annual | 0.38 | 1.0 (2) |
| H2SO4 | 24-hour | 1.52 | 50 (3) |
| PM10 | 24-hour | 2.0 | 5 (4) |
| PM10 | Annual | 0.11 | 1 (4) |
| NH3 | 24-hour | 1.27 | 900 (3) |

1. Based on three years of AERMOD predictions
2. PSD Significant Impact Level (SIL) for NO2. MFG conservatively assumes all NOx emitted is converted to NO2. Concentrations predicted below the SIL are considered insignificant for regulatory purposes.
3. Acceptable Ambient Concentrations for toxic air pollutants.
4. Definition of Significant Contribution for PM10



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# Appendix A: Notice of Public Meeting

PUBLIC NOTICE

J.R Simplot Company, Don Plant will hold an informal meeting in accordance with IDAPA 58.01.213.02(a) on November 22, 2000 at the Simplot Frontier Building, 1130 West Hwy 30, Pocatello, Idaho, at 11:30 am. The purpose of this meeting will be to discuss Simplot's Permit to Construct application for project work at the Don Plant #300 Sulfuric Acid Plant, located 5 miles west of Pocatello. Published November 12, 2000 in the Idaho State Journal.

8 NOV 2000

TO: Idaho State Journal
Classified Ads - Legal
Fax 233-1642

FROM: Leon Powell
Simplot Don Plant
241-7470

# Appendix B: Applicable Requirements

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## I. Federal Regulatory Requirements

| Emissions Unit | Citation under Federal Regulations | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| N/A | 40 CFR Part 52 | No | Approval and Promulgation of Implementation Plans; Rules for Prevention of Significant Deterioration. |
| #3 Sulfuric | 40 CFR Part 60 | Yes | Standards of Performance for New Stationary Sources. |
| #3 Sulfuric | 40 CFR Part 60, Subpart A | Yes | General Provisions. |
| #3 Sulfuric | 40 CFR §60.7 | Yes | Notification and recordkeeping requirements. |
| #3 Sulfuric | 40 CFR §60.8 | Yes | Performance test requirement. |
| #3 Sulfuric | 40 CFR §60.11 | Yes | Compliance with standards and maintenance requirements. |
| #3 Sulfuric | 40 CFR §60.12 | Yes | Circumvention. |
| #3 Sulfuric | 40 CFR §60.13 | Yes | Monitoring requirements. |
| #3 Sulfuric | 40 CFR §60.14 | Yes | Modification. |
| #3 Sulfuric | 40 CFR §60.15 | Yes | Reconstruction. |
| #3 Sulfuric | 40 CFR Part 60, Subpart H | Yes | Standards of Performance for Sulfuric Acid Plants |
| #3 Sulfuric | 40 CFR §60.80 | Yes | Applicability and designation of affected facility. |
| #3 Sulfuric | 40 CFR §60.81 | Yes | Definitions. |
| #3 Sulfuric | 40 CFR §60.82 | Yes | Standard for sulfur dioxide.<br>• Emissions from any affected facility shall not contain sulfur dioxide in excess of 2 kg/metric ton of acid produced (4 lb/ton) |
| #3 Sulfuric | 40 CFR §60.83 | Yes | Standard for acid mist.<br>Emissions from any affected facility shall not:<br>• Contain acid mist, expressed as H2SO4, in excess of 0.075 kg/metric ton of acid produced (0.15 lb/ton)<br>• Exhibit 10 percent opacity, or greater |
| #3 Sulfuric | 40 CFR §60.84 | Yes | Emission monitoring<br>• Install, calibrate, maintain, and operate a continuous monitoring system for the measurement of sulfur dioxide.<br>• Establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard. |
| #3 Sulfuric | 40 CFR §60.85 | Yes | Test methods and procedures. |
| N/A | 40 CFR Part 70 | No | State Operating Permit Program. |
| N/A | 40 CFR Part 82 | No | Chlorofluorocarbon Regulations<br>• #3 does not emit CFCs |

## II. Idaho Regulatory Requirements

| Emission Unit | Citation under IDAPA 58.01.01 | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| N/A | 000 | No | LEGAL AUTHORITY. |
| N/A | 001 | No | TITLE AND SCOPE. |
| N/A | 002 | No | WRITTEN INTERPRETATIONS. |
| N/A | 003 | No | ADMINISTRATIVE APPEALS. |
| N/A | 004 | No | CATCHLINES. |
| N/A | 005 | No | DEFINITIONS. |
| #3 Sulfuric | 006 | Yes | GENERAL DEFINITIONS. |
| #3 Sulfuric | 007 | Yes | DEFINITIONS FOR THE PURPOSES OF SECTIONS 200 THROUGH 223 AND 400 THROUGH 461. |
| N/A | 008 | No | DEFINITIONS FOR THE PURPOSES OF SECTIONS 300 THROUGH 386<br>• Operating permit provisions are not relevant to the drafting of a PTC |
| #3 Sulfuric | 009 | Yes | DEFINITIONS FOR THE PURPOSES OF 40 CFR PART 60. |
| N/A | 010 | No | DEFINITIONS FOR THE PURPOSES OF 40 CFR PART 61 AND 40 CFR PART 63. |
| N/A | 106 | No | ABBREVIATIONS. |
| N/A | 107 | No | INCORPORATIONS BY REFERENCE. |
| N/A | 121 | No | COMPLIANCE REQUIREMENTS BY DEPARTMENT |
| #3 Sulfuric | 122 | Yes | INFORMATION ORDERS BY THE DEPARTMENT |
| #3 Sulfuric | 123 | Yes | CERTIFICATION OF DOCUMENTS. |
| #3 Sulfuric | 124 | Yes | TRUTH, ACCURACY AND COMPLETENESS OF DOCUMENTS. |
| #3 Sulfuric | 125 | Yes | FALSE STATEMENTS. |
| #3 Sulfuric | 126 | Yes | TAMPERING. |
| #3 Sulfuric | 127 | Yes | FORMAT OF RESPONSES. |
| N/A | 128 | No | CONFIDENTIAL INFORMATION. |
| #3 Sulfuric | 130 | Yes | STARTUP, SHUTDOWN, SCHEDULED MAINTENANCE, SAFETY MEASURES, UPSET AND BREAKDOWN |
| #3 Sulfuric | 131 | Yes | EXCESS EMISSIONS.<br>• Applicability. |
| #3 Sulfuric | 132 | Yes | CORRECTION OF CONDITION.<br>• Excess emission events must be corrected with all practical speed. |
| #3 Sulfuric | 133 | Yes | STARTUP, SHUTDOWN AND SCHEDULED MAINTENANCE REQUIREMENTS.<br>• Prescribes procedures for where startup, shutdown, or scheduled maintenance is expected to result in an excess emissions event. |
| #3 Sulfuric | 134 | Yes | UPSET, BREAKDOWN AND SAFETY REQUIREMENTS.<br>• Prescribes procedures for where upset or breakdown or the initiation of safety measures is expected to result in an excess emissions event. |
| #3 Sulfuric | 135 | Yes | EXCESS EMISSIONS REPORTS.<br>• Written reports for each excess emissions must be submitted to the Department within 15 days after the beginning of the event. |
| #3 Sulfuric | 136 | Yes | EXCESS EMISSIONS RECORDS.<br>• Records of excess emissions must be maintained for 5 years. |
| N/A | 140-149 | No | VARIANCE PROCEDURES and PETITIONS. |
| #3 Sulfuric | 155 | Yes | CIRCUMVENTION. |
| #3 Sulfuric | 156 | Yes | TOTAL COMPLIANCE. |

| Emission Unit | Citation under IDAPA 58.01.01 | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| #3 Sulfuric | 157 | Yes | TEST METHODS AND PROCEDURES.<br>• Establishes procedures and requirements for test methods and results. |
| N/A | 160 | No | PROVISIONS GOVERNING SPECIFIC ACTIVITIES AND CONDITIONS. |
| #3 Sulfuric | 161 | Yes | TOXIC SUBSTANCES.<br>• Toxic contaminants shall not be emitted as to injure or unreasonably affect human or animal life or vegetation. |
| N/A | 162 | No | MODIFYING PHYSICAL CONDITIONS. |
| N/A | 163 | No | SOURCE DENSITY. |
| N/A | 164 | No | POLYCHLORINATED BIPHENYLS (PCBS). |
| #3 Sulfuric | 200 | Yes | PROCEDURES AND REQUIREMENTS FOR PERMITS TO CONSTRUCT. |
| #3 Sulfuric | 201 | Yes | PERMIT TO CONSTRUCT REQUIRED. |
| #3 Sulfuric | 202 | Yes | APPLICATION PROCEDURES. |
| #3 Sulfuric | 203 | Yes | PERMIT REQUIREMENTS FOR NEW AND MODIFIED STATIONARY SOURCES. |
| N/A | 204 | No | PERMIT REQUIREMENTS FOR NEW MAJOR FACILITIES OR MAJOR MODIFICATIONS IN NONATTAINMENT AREAS<br>• Restoration Project is not a major modification |
| N/A | 205 | No | PERMIT REQUIREMENTS FOR NEW MAJOR FACILITIES OR MAJOR MODIFICATIONS IN ATTAINMENT OR UNCLASSIFIABLE AREAS |
| N/A | 206 | No | OPTIONAL OFFSETS FOR PERMITS TO CONSTRUCT |
| #3 Sulfuric | 207 | Yes | REQUIREMENT FOR EMISSION REDUCTION CREDIT<br>• Simplot intends to seek ERCs for the SO2 reduction |
| N/A | 208 | No | DEMONSTRATION OF NET AIR QUALITY BENEFIT. |
| #3 Sulfuric | 209 | Yes | PROCEDURE FOR ISSUING PERMITS. |
| #3 Sulfuric | 210 | Yes | DEMONSTRATION OF PRECONSTRUCTION COMPLIANCE WITH TOXIC STANDARDS. |
| #3 Sulfuric | 211 | Yes | CONDITIONS FOR PERMITS TO CONSTRUCT. |
| #3 Sulfuric | 212 | Yes | OBLIGATION TO COMPLY. |
| #3 Sulfuric | 213 | Yes | PRE-PERMIT CONSTRUCTION. |
| N/A | 214 | No | DEMONSTRATION OF PRECONSTRUCTION COMPLIANCE FOR NEW AND RECONSTRUCTED MAJOR SOURCES OF HAZARDOUS AIR POLLUTANTS<br>• #3 would not emit HAPs |
| N/A | 220 | No | GENERAL EXEMPTION CRITERIA FOR PERMIT TO CONSTRUCT EXEMPTIONS. |
| N/A | 221 | No | CATEGORY I EXEMPTION. |
| N/A | 222 | No | CATEGORY II EXEMPTION. |
| N/A | 223 | No | EXEMPTION CRITERIA AND REPORTING REQUIREMENTS FOR TOXIC AIR POLLUTANT EMISSIONS. |
| N/A | 300-386 | No | PROCEDURES AND REQUIREMENTS FOR TIER I OPERATING PERMITS.<br>• Operating permit provisions are not relevant to the drafting of a PTC |
| N/A | 400-406 | No | PROCEDURES AND REQUIREMENTS FOR TIER II OPERATING PERMITS<br>• Operating permit provisions are not relevant to the drafting of a PTC |
| N/A | 440 | No | REQUIREMENTS FOR ALTERNATIVE EMISSION LIMITS (BUBBLES). |
| N/A | 441 | No | DEMONSTRATION OF AMBIENT EQUIVALENCE. |
| #3 Sulfuric | 460 | Yes | REQUIREMENTS FOR EMISSION REDUCTION CREDIT.<br>• Simplot intends to seek ERCs for the SO2 reduction |
| #3 Sulfuric | 461 | Yes | REQUIREMENTS FOR BANKING EMISSION REDUCTION CREDITS (ERC'S).<br>• Simplot intends to seek ERCs for the SO2 reduction |
| N/A | 470 | No | PERMIT APPLICATION FEES FOR TIER II PERMITS. |

| Emission Unit | Citation under IDAPA 58.01.01 | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| N/A | 500 | No | REGISTRATION PROCEDURES AND REQUIREMENTS FOR PORTABLE EQUIPMENT. |
| #3 Sulfuric | 510-516 | Yes | STACK HEIGHTS AND DISPERSION TECHNIQUES. |
| N/A | 525-538 | No | REGISTRATION AND REGISTRATION FEES<br>• #3 Sulfuric is already registered and has a PTC |
| N/A | 550-562 | No | AIR POLLUTION EMERGENCY RULE. |
| N/A | 575-576 | No | AIR QUALITY STANDARDS AND AREA CLASSIFICATION. |
| N/A | 577 | No | AMBIENT AIR QUALITY STANDARDS FOR SPECIFIC AIR POLLUTANTS.<br>• Standards do not apply to individual stationary sources. |
| N/A | 578 | No | DESIGNATION OF ATTAINMENT, UNCLASSIFIABLE AND NONATTAINMENT AREAS.<br>• Standards do no apply to individual stationary sources. |
| N/A | 579-581 | No | AIR QUALITY STANDARDS AND AREA CLASSIFICATION CONT'D. |
| N/A | 585 | No | TOXIC AIR POLLUTANTS NON-CARCINOGENIC INCREMENTS.<br>• Provision does not impose substantive requirement. |
| N/A | 586 | No | TOXIC AIR POLLUTANTS CARCINOGENIC INCREMENTS.<br>• Provision does not impose substantive requirement. |
| N/A | 587 | No | LISTING OR DELISTING TOXIC AIR POLLUTANT INCREMENTS. |
| #3 Sulfuric | 590 | Yes | NEW SOURCE PERFORMANCE STANDARDS.<br>• The owner or operator of any stationary source shall comply with 40 CFR Part 60 as applicable to the stationary source. |
| N/A | 591 | No | NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS.<br>• The owner or operator of any stationary source shall comply with 40 CFR Part 61 and 40 CFR Part 63 as applicable to the stationary source.<br>• There are no NESHAPs that apply to sulfuric acid plants. |
| N/A | 600-616 | No | RULES FOR CONTROL OF OPEN BURNING. |
| #3 Sulfuric | 625 | Yes | VISIBLE EMISSIONS.<br>• A person shall not emit an air pollutant from any point of emission for a period or periods aggregating more that 3 minutes in any 60-minute period, which is greater, that 20% opacity.<br>• Prescribes test methods and procedures for performance testing. |
| N/A | 626 | No | GENERAL RESTRICTIONS ON VISIBLE EMISSIONS FROM WIGWAM BURNERS. |
| #3 Sulfuric | 650 | Yes | RULES FOR CONTROL OF FUGITIVE DUST. |
| #3 Sulfuric | 651 | Yes | GENERAL RULES.<br>• Reasonable precautions shall be taken to prevent particulate matter from becoming airborne. |
| N/A | 675-681 | No | • FUEL BURNING EQUIPMENT.<br>• #3 does not met the definition of fuel-burning equipment |
| N/A | 700-703 | No | PARTICULATE MATTER – PROCESS WEIGHT LIMITATIONS.<br>• Process weight was not identified in a permit for #3 issued prior to July 1, 2000. Therefore, process weight provisions do not apply. |
| N/A | 725-729 | No | RULES FOR SULFUR CONTENT OF FUELS.<br>• #3 does not met the definition of fuel-burning equipment |
| N/A | 750-751 | No | RULES FOR CONTROL OF FLUORIDE EMISSIONS.<br>• #3 is not a source of fluoride |
| #3 Sulfuric | 775 | Yes | RULES FOR CONTROL OF ODORS. |

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| Emission Unit | Citation under IDAPA 58.01.01 | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| #3 Sulfuric | 776 | Yes | GENERAL RULES.<br>• Odorous gases, liquids or solids shall not be emitted as to cause air pollution. |
| N/A | 785-787 | No | RULES FOR CONTROL OF INCINERATORS. |
| N/A | 805-808 | No | RULES FOR CONTROL OF HOT-MIX ASPHALT PLANTS. |
| N/A | 815-826 | No | RULES FOR CONTROL OF KRAFT PULPING MILLS. |
| N/A | 835-839 | No | RULES FOR CONTROL OF RENDERING PLANTS. |
| #3 Sulfuric | 845 | Yes | RULES FOR CONTROL OF SULFUR OXIDE EMISSIONS FROM SULFURIC ACID PLANTS. |
| #3 Sulfuric | 846 | Yes | EMISSION LIMITS.<br>• Emissions from any sulfuric acid plant shall not contain sulfur oxides in excess of 28 lb/ton of 100% sulfuric acid produced. |
| #3 Sulfuric | 847 | Yes | MONITORING AND TESTING.<br>• Prescribes test methods and procedures for performance testing. |
| #3 Sulfuric | 848 | Yes | COMPLIANCE SCHEDULE. |
| N/A | 855-858 | No | COMBINED ZINC AND LEAD SMELTERS. |
| N/A | 859-860 | No | RULES FOR MUNICIPAL SOLID WASTE LANDFILLS |
| N/A | 861-862 | No | STANDARDS OF PERFORMANCE FOR HOSPITAL/MEDICAL/INFECTIOUS WASTE INCINERATORS |
| #3 Sulfuric | PTC 077-00006 | Yes | NOx emissions shall not exceed 0.40 lb/ton of sulfuric acid production or 128 TPY<br>• With this application, Simplot proposes to change these NOx emission limits to 0.20 lb/ton of sulfuric acid and 64 tons per year |
| #3 Sulfuric | PTC 077-00006 | Yes | The maximum sulfuric acid production rate shall not exceed 640,000 TPY |
| #3 Sulfuric | PTC 077-00006 | Yes | Monitoring Requirements:<br>• Monitor and record sulfuric acid production monthly |
| #3 Sulfuric | PTC 077-00006 | Yes | Reporting Requirements:<br>• Maintain the most recent 2-years sulfuric acid production data on site and make available to Department representatives upon request<br>• All documents, including reports, shall contain certification of a responsible official according to IDAPA 16.01.01.123. |
| #3 Sulfuric | Tier II 077-00006: 2.1.1 | Yes | SO2 emissions shall not exceed 750 lb per each running 3-hour period, as determined by Method 8 or DEQ-approved alternative.<br>• With this application, Simplot proposes to change this emission limit to 510 lb per each running 3-hour period. |
| #3 Sulfuric | Tier II 077-00006: 2.1.1 | Yes | SO2 emissions shall not exceed 1,095 tons per year<br>• With this application, Simplot proposes to change this emission limit to 745 tons per year |
| #3 Sulfuric | Tier II 077-00006: 2.1.2 | Yes | Sulfuric acid mist emissions shall not exceed 0.15 lb/ton of 100% sulfuric acid produced as required in 40 CFR 60.83 and 9.4 pounds per hour, whichever is more restrictive, as determined by US EPA Method 8, or DEQ-approved emission test<br>• With this application, Simplot proposes an emission limit of 0.041 lb/ton on an annual average basis. |
| #3 Sulfuric | Tier II 077-00006: 2.1.2 | Yes | Sulfuric acid mist emissions shall also not exceed 41.1 tons per year<br>• With this application, Simplot proposes an emission limit of 13.1 tons per year |

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| Emission Unit | Citation under IDAPA 58.01.01 | Applicable Requirement | Description of Requirements or Standards |
|---|---|---|---|
| #3 Sulfuric | Tier II 077-00006: 2.1.3 | Yes | Visible emissions shall not exceed 20% opacity for more than 3 minutes aggregate in any 60 minute period.<br>• As a result of this application, the more stringent 10% opacity limit associated with NSPS will apply to #3 |
| #3 Sulfuric | Tier II 077-00006: 3 | Yes | Monitoring and operating requirements |
| #3 Sulfuric | Tier II 077-00006: 4 | Yes | Monitoring<br>• Annual SO2, acid mist, and visible emission tests shall be performed at the process equipment's maximum operating rate<br>• Install, operate, maintain, and calibrate CEM for SO2<br>• Operate ambient SO2 monitors S1 and S7 at their present locations•<br>• Conduct annual audits of SO2 monitors and send results to DEQ<br><br>• With this application, Simplot proposes to source test NOx emissions annually to establish an emission factor expressed as lb NOx per ton of acid produced. |
| #3 Sulfuric | Tier II 077-00006: 5 | Yes | Reporting requirements |

# Appendix C: Ambient Air Quality Analysis

# Appendix C. Dispersion Modeling Analysis
# 300 Sulfuric Acid Plant Restoration Project

## Introduction

MFG prepared this dispersion modeling analysis in support of a Permit to Construct application for the 300 Sulfuric Acid Plant Restoration Project at J.R. Simplot Company's Don Plant near Pocatello, Idaho. The location of the Don Plant and surrounding terrain are shown in Figure 1. The restoration of the existing 300 Sulfuric Acid Plant (hereafter, #3) involves replacement of several major process components, including the converter, and an upgrade to the scrubbing system. These modifications at the Don Plant would result in potential increases in nitrogen oxides (NOx), sulfuric acid mist (H2SO4), and ammonia (NH3) emissions. Sulfur dioxide (SO2) would decrease as a result of the scrubber upgrade. There are no significant emissions of volatile organic compounds or carbon monoxide from the plant. The location and stack characteristics after the restoration would be the same as the existing #3.

MFG applied regulatory dispersion modeling tools to investigate whether potential emission increases cause a violation of National Ambient Air Quality Standards (NAAQS) or exceed Idaho Division of Environmental Quality (IDEQ) Acceptable Ambient Concentrations for toxic air pollutants. The remainder of Appendix C describes the input data, modeling techniques, and the results of MFG's modeling analysis.

## Dispersion Modeling Techniques

MFG surveyed current regulatory modeling techniques to select the most appropriate model to simulate pollutant releases from #3. The location of #3 and major nearby structures at the Don Plant are shown in Figure 2. Building downwash effects and nearby elevated terrain features sometimes result in high ground level concentrations from industrial sources. The #3 stack has a height of 202 feet and would be sufficiently high to escape potential downwash effects from buildings within the Don Plant. However, as shown in Figure 1, elevated terrain is located south and southeast of the Don Plant suggesting potential impacts from a buoyant plume intersecting receptors at these locations.

**AERMOD.** Due to the proximity of nearby elevated terrain, MFG selected the latest version of the EPA regulatory model AERMOD (Version 99351) for the modeling analysis. The EPA proposed AERMOD as a replacement to ISCST3 during the *7th Conference on Air Quality Modeling* held on June 28-29, 2000 in Washington, D.C. EPA allows the application of AERMOD on a case-by-case basis until the model is formally included in the *Guideline on Air Quality Models* (Appendix W of 40 CFR Part 51). AERMOD will replace ISCST3 in the near future for most regulatory analyses involving complex terrain and tall stacks.

AERMOD is the result of collaboration between the American Meteorological Society and EPA to include more up-to-date diffusion routines in EPA regulatory models. Although many of the improvements target improved simulation of elevated plumes in the convective boundary layer,



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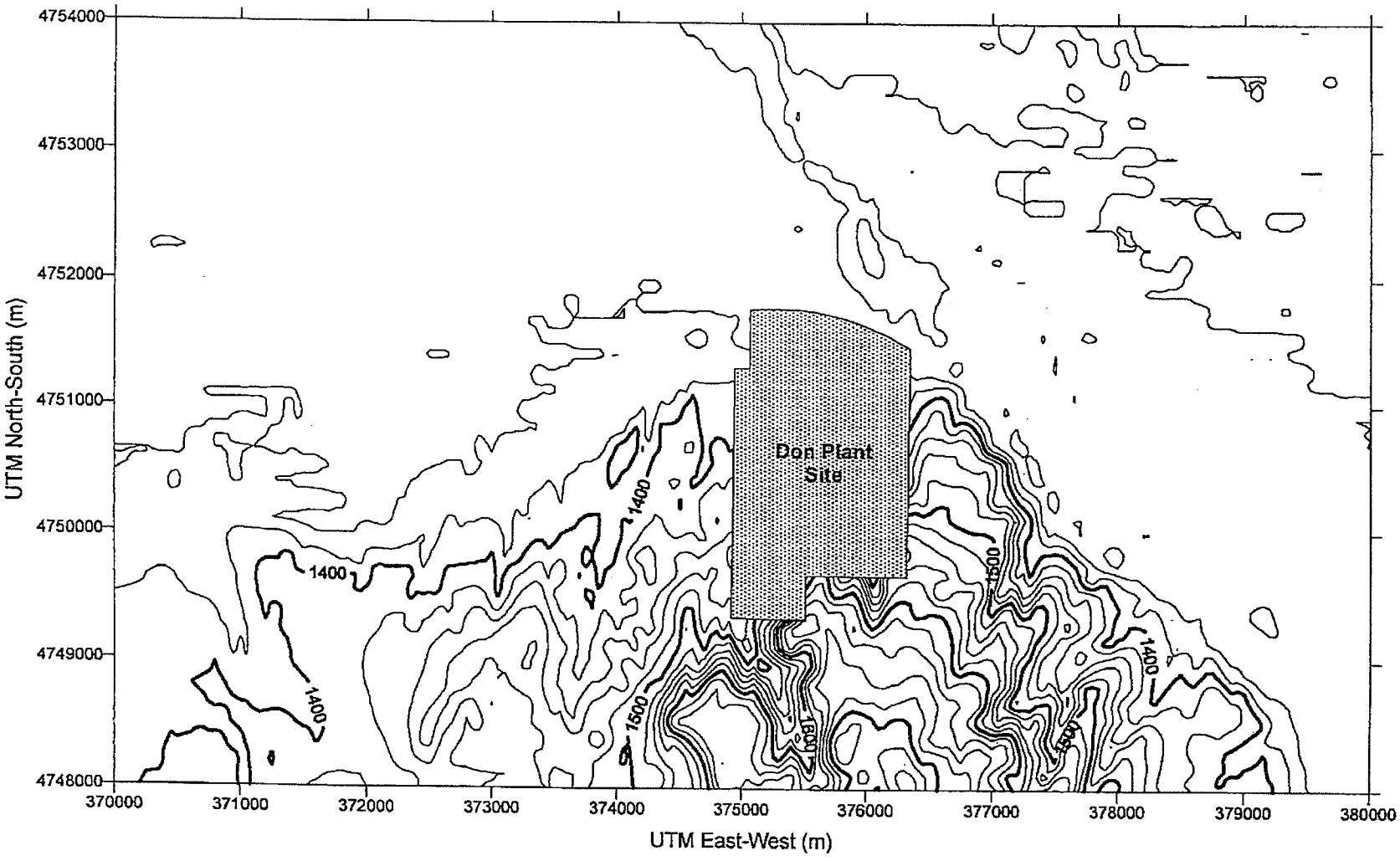
**Figure 1. Terrain Surrounding Simplot**
**Contours in Meters**



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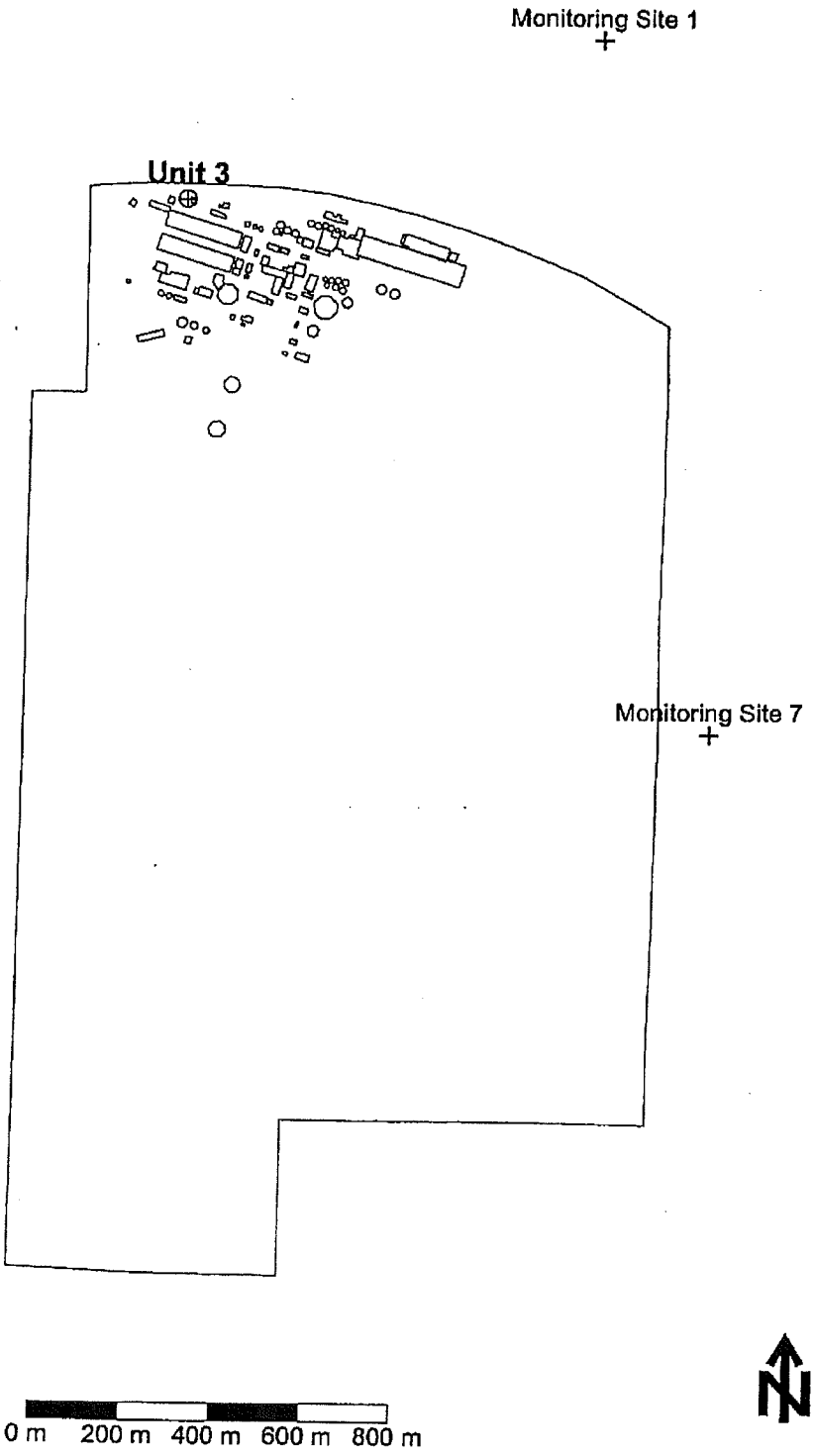
## Figure 2. Simplot Don Plant
## Site Boundary, Buildings, Monitoring Sites and Unit 3 Sulfuric Acid Plant



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EPA model evaluation studies indicate these routines also provide better estimates for plumes impacting elevated terrain. AERMOD incorporates dispersion algorithms that:

- depart from the traditional Pasquill-Gifford dispersion curves used in ISCST3. Diffusion in AERMOD is based on boundary layer relationships for the lateral and vertical turbulence intensity that depend on the surface energy fluxes and the mixed layer height. These variables are varied in height according to similarity theory and predicted dispersion compares more favorably with observations for a larger variety of sources and meteorological conditions

- consider partial plume penetration of an elevated inversion. During the calculation of ground level concentration, ISCST3 neglects plumes with effective heights predicted above an elevated inversion and does not consider that these plumes may not penetrate such inversions

- use local turbulence measurements directly for estimates of lateral and vertical diffusion when these data are available. Simplot measures sigma-theta at its Site 1 and Site 7 monitoring stations and AERMOD can use these observations to more accurately characterize lateral diffusion

- feature a non-Gaussian or skewed vertical probability distribution function during convective conditions

- allow for vertical profiles of the transport winds and diffusion parameters. Characterization of these variables is based on an average over the vertical depth of the plume rather than a single level of 10 m

- more accurately simulate elevated plumes in complex terrain using a "divided streamline" approach. The routines used to estimate concentrations in complex terrain are less conservative for most sources and do a better job than ISCST3 explaining monitored SO2 concentrations near Site 7. MFG has found monitored SO2 concentrations at Site 7 are much less than predicted by ISCST3

Plume depletion due to removal mechanisms like dry deposition is not currently included in AERMOD, nor is plume chemistry or recent advances in building downwash treatment. However, these are not issues that need to be addressed in the current application.

MFG is currently conducting a model evaluation study to investigate modeling techniques for revision of the SO2 SIP for the Eastern Idaho Intrastate Air Quality Control Region (40 CFR Part 52.675). A Model Evaluation Protocol was submitted for review to IDEQ and EPA on April 11, 2000 and EPA approved the *Protocol* on April 18, 2000. The study includes a comparison of AERMOD and ISCST3 model performance using SO2 data collected near the Don Plant. The analysis clearly indicates AERMOD outperforms ISCST3, especially in complex terrain based on the monitoring data from Site 7. We presented the preliminary results of our analysis to EPA in a meeting held in our Lynnwood office on July 11, 2000. At this meeting Mahbubul Islam of Region 10 agreed with our evaluation of model performance and verbally approved the



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application of AERMOD for the SO2 SIP. MFG believes AERMOD is the best regulatory model available to simulate potential impacts of #3 based on consideration of the important modeling issues, AERMOD's demonstrated performance in EPA model evaluation studies, and MFG's previous experience with SO2 modeling at the Don Plant using ISCST3.

**Emission rates and stack parameters.** Table 1 and Table 2 list the respective emission rates and stack parameters used in the modeling analysis. The restored #3 Sulfuric Acid Plant would have annual allowable NOx, H2SO4, and NH3 emissions of 63.9 TPY, 13.1 TPY, and 11 TPY, respectively. Annual emission limits for the restored plant are based on continuous annual operation of the unit at the maximum hourly design emission rates shown in Table 1 and do not consider offsets from the existing unit. The actual net increase in emissions of these pollutants will be much lower than the rates used in this analysis. Only NOx, H2SO4 and NH3 have the potential to increase as a result of this project, and as explained in the emissions section of this application, even these increases may not materialize.

**Table 1. Emission Rates Evaluated in Modeling**

| Pollutant | Hourly (lb/hr) | Annual (TPY) (*) |
|---|---|---|
| NOx | 14.6 | 64 |
| H2SO4 | 3 | 13.1 |
| PM10 | 4 | 17.7 |
| NH3 | 2.50 | 11.0 |

Annual TPY based on continuous operation at 8760 hours per year.

PM10 is being evaluated only to demonstrate that concentrations are less than significant impact levels even if all sulfate were emitted as particulate ammonium sulfate. In fact, the sulfate is emitted either as H2SO4 or PM10, so the modeling assessment considers both extremes.

**Table 2. #3 Stack Parameters**

| Parameter | Existing and Future Design Value |
|---|---|
| Stack Height (ft) | 202 |
| Flow Rate (acfm) | 102,000 |
| Diameter (ft) | 4.5 |
| Temperature (°F) | 85 |



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Table 1 also identifies PM10 emissions. As discussed in the emission section of this application, Simplot has historically reported sulfate emissions as H2SO4 (acid mist). However, the use of ammonia in the Ammsox scrubber to control SO2 emissions is likely to result in some of the sulfate being emitted as ammonium sulfate, a particle. The fraction of sulfate emitted as H2SO4 versus ammonium sulfate is not known. Simplot intends to continue to report sulfate emissions as acid mist. However, this assessment addresses the possibility that all sulfate is emitted as PM10. In fact, the sulfate is emitted either as H2SO4 or PM10, so the modeling assessment is double counting sulfate when it considers both extremes.

Ground level concentrations can be heavily influenced by release characteristics including stack parameters and wakes from nearby structures. MFG applied the EPA Building Profile Input Program (BPIP) to ensure the #3 stack would not be influenced by nearby structures. BPIP applies EPA Good Engineering Practice stack height design guidance based on building locations, building heights, stack heights, and stack locations. MFG prepared these data using building elevations and site plans provided by Simplot. The BPIP analysis indicates dispersion from the #3 stack would not be influenced by any new or existing structures.

**Receptor network.** Figure 3 displays the receptor network used by MFG for model simulations of emissions from the #3 Sulfuric Acid Plant. The 250-m resolution grid covers a 10 km-by-6 km area roughly centered on the #3 stack. Note the grid includes receptors located within the neighboring FMC site boundary. MFG also placed receptors along the Don Plant boundary and at nearby monitoring sites.

MFG obtained terrain elevations for receptors in Figure 3 using digital elevation data from the United States Geological Survey's (USGS) 7.5-minute Pocatello-North, Pocatello-South, Michuad Creek and Michuad quadrangles. The complex terrain algorithms contained in AERMOD depend on the calculation of terrain scale heights and other variables influenced by local topography. Terrain elevations and terrain scale heights were extracted at the receptor locations using the AERMAP terrain pre-processor program that is part of the AERMOD modeling system.

**Meteorological data.** MFG constructed a three-year meteorological database using surface observations from Pocatello Airport and wind data at the 62-foot level from Simplot's meteorological tower at Site 1. These data from 1997 through 1999 were combined with concurrent upper air data from Boise Airport using the EPA meteorological pre-processor AERMET. Wind data from the Simplot monitoring Site 1 and cloud information from Pocatello Airport were used by AERMET to construct a three-year data set. AERMET also requires a number of different variables assigned as follows:

- Additional meteorological variables and geophysical parameters are required by AERMET to estimate the surface energy fluxes and construct boundary layer profiles. Surface characteristics including the surface roughness length, albedo, and Bowen ratio were assigned using the guidance in *AERMET User's Guide* on a sector-by-sector and seasonal basis. Namely:



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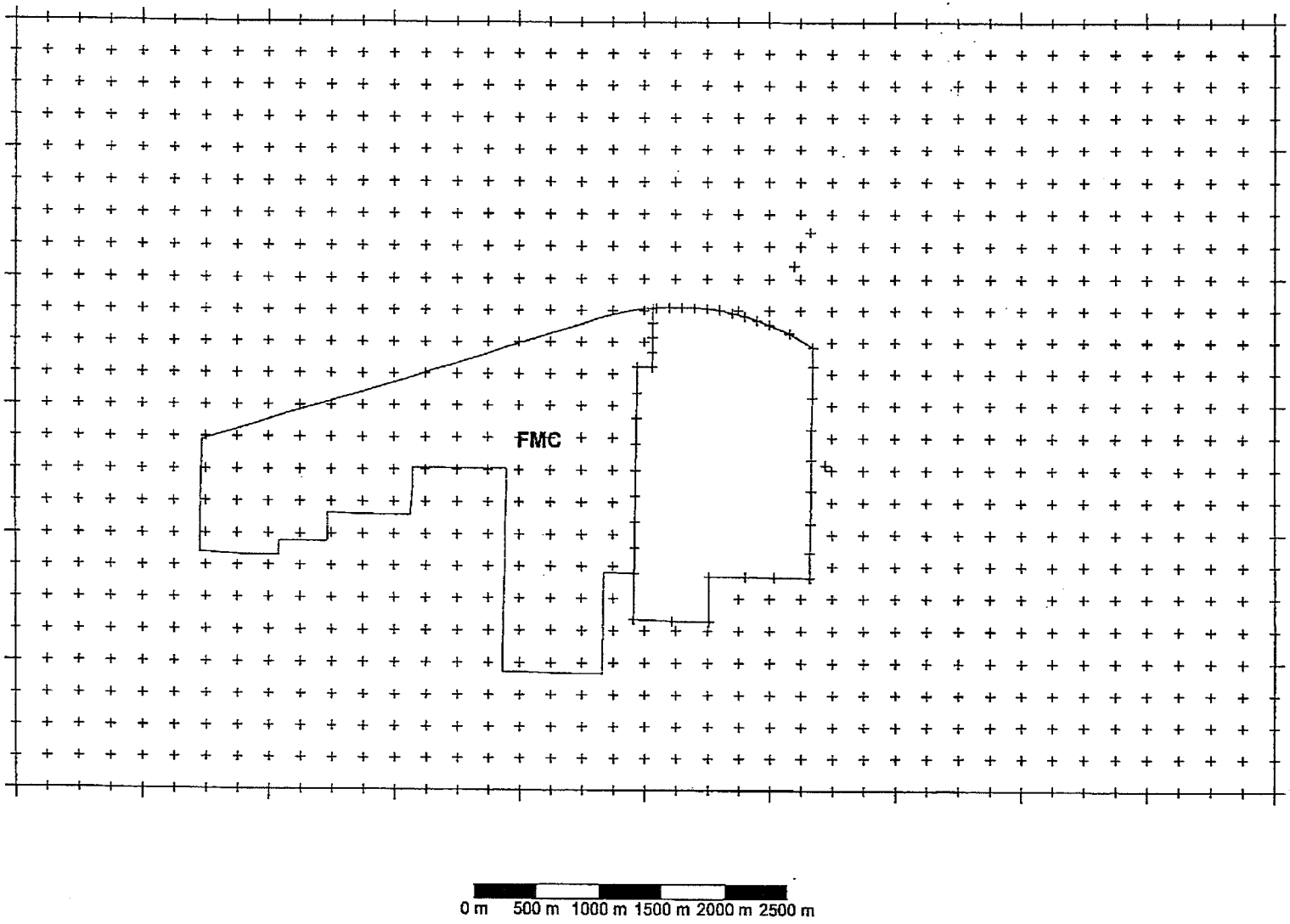
## Figure 3. Receptor Locations Including Receptors Inside FMC



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- for northerly sectors, MFG used an average of the seasonal surface characteristics for "Desert Shrubland" and "Cultivated Land" to represent to the mixed land use north of the Don Plant

- for southerly sectors, MFG used the seasonal characteristics recommended for "Desert Shrubland" in the *AERMET User's Guide*

- Bowen ratio's for summer and fall were assigned based on the variables provided in the *AERMET User's Guide* for "dry" moisture conditions

- AERMOD can use turbulence observations directly for estimates of lateral and vertical plume diffusion. MFG used the sigma-theta data from the Simplot tower measurements as input into AERMOD for estimation of lateral diffusion. This should improve the characterization of plume meander during stable conditions that can be important for estimates in complex terrain.

- AERMET requires a representative morning sounding for calculation of the convective mixed layer height. Unlike the use of this variable by ISCST3, the mixed layer height is used as a scaling parameter affecting diffusion estimates by AERMOD during daytime hours. The lapse rate data also influence the inversion plume penetration algorithms. In the absence of a local morning sounding, the Boise soundings were used as input into AERMET.

Figure 4 displays a wind rose of the three-year meteorological database. Winds at Site 1 are bimodal, either coming from the west-southwest following the orientation of the Snake River valley or from the southeast out of the Portneuf River valley. The average wind velocity for the three-year data set is 4.5 m/s and periods of calm occur for only 0.8% of the observations. Figure 4 also shows light winds (denoted by the clear bars) tend to blow from a northerly direction towards elevated terrain. MFG believes these conditions are due to an eddy that sometimes forms at the confluence of the Portneuf River and Snake River valleys.

**Dispersion Modeling Results**

MFG applied AERMOD to simulate proposed emissions from the restored #3 Sulfuric Acid Plant using three years of meteorological data and other modeling assumptions discussed above. The results of the dispersion modeling are summarized in Table 3 where the maximum concentrations from #3 emissions at the Don Plant are compared to IDEQ Acceptable Ambient Concentrations and the NAAQS. MFG constructed the contour plot shown in Figure 5 based on predicted maximum annual NOx concentrations at each receptor. Twenty-four hour maximum H2SO4 and NH3 concentration predictions are also shown in Figure 6 and Figure 7, respectively.



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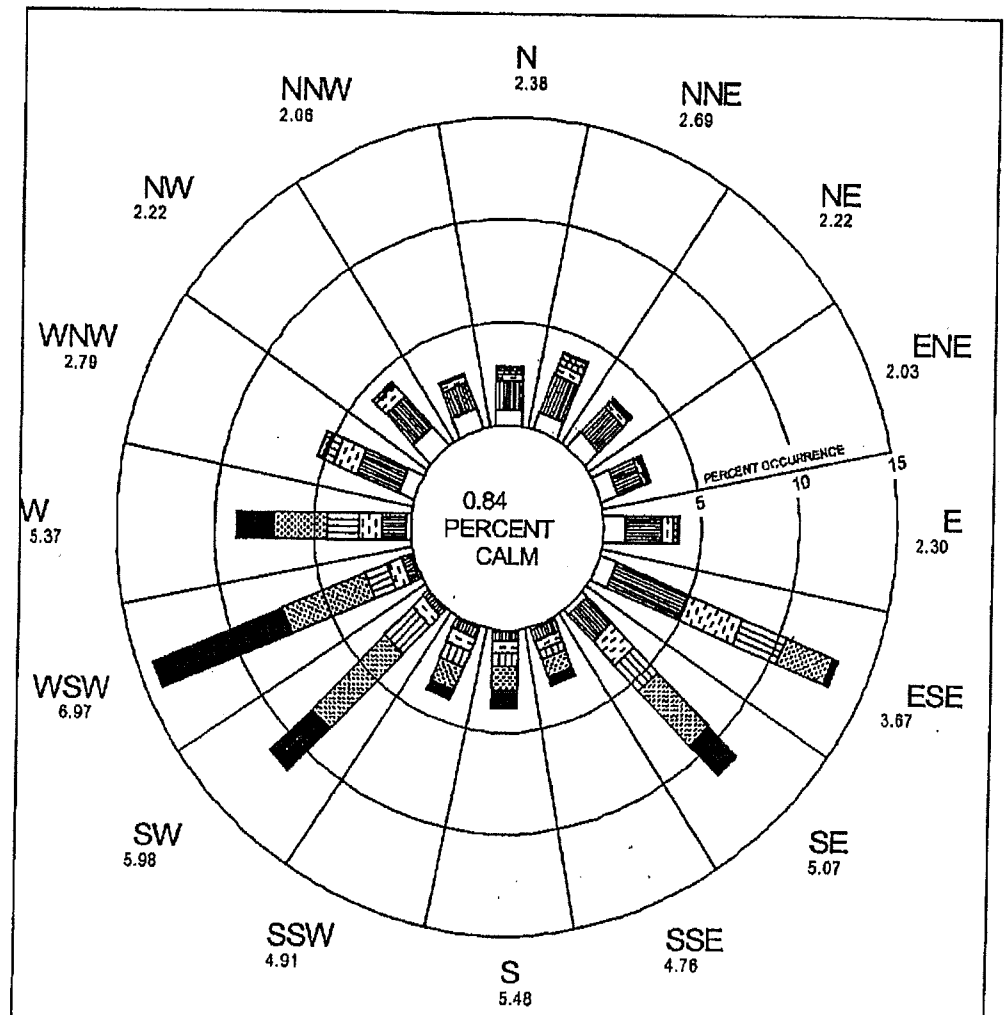


Figure 4. Wind Rose for Simplot Site 1 (19m)
1997-1999



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## Figure 5. Maximum Annual NOx Concentrations (ug/m3) Predicted for Unit 3

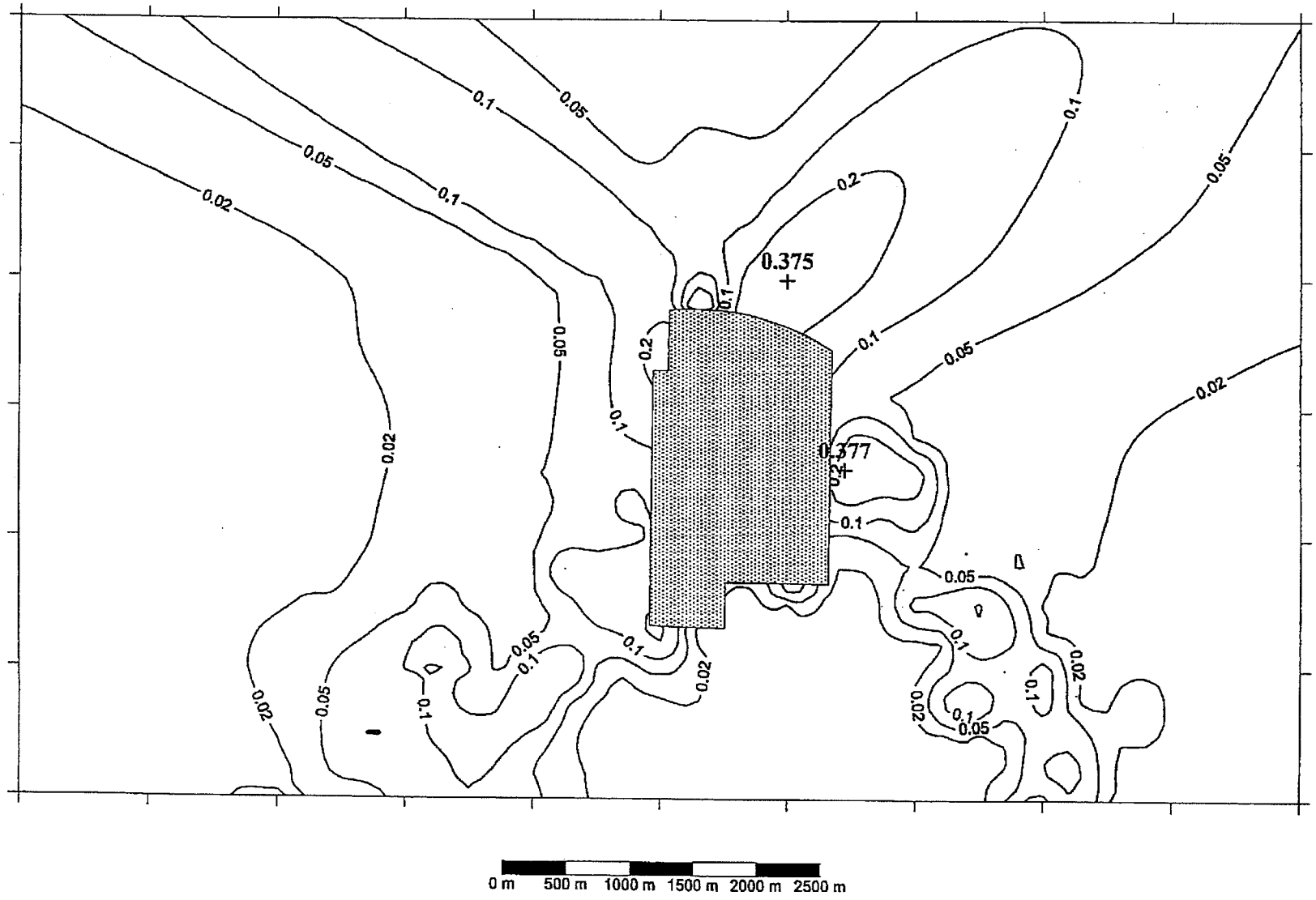




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Figure 6. Maximum 24-hour H2SO4 Concentrations (ug/m3) Predicted for Unit 3

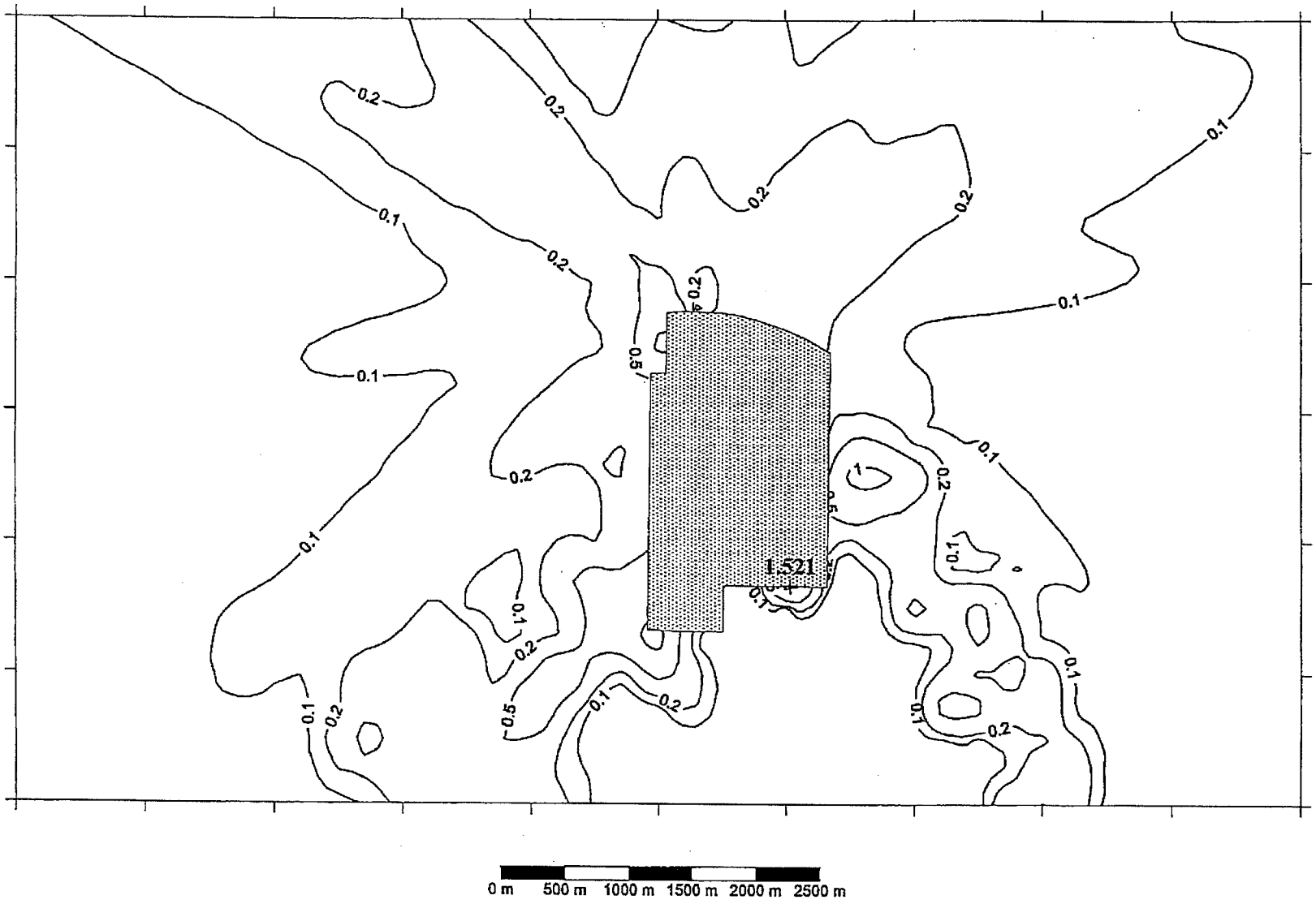




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**Figure 7. Maximum 24-hour NH3 Concentrations (ug/m3) Predicted for Unit 3**

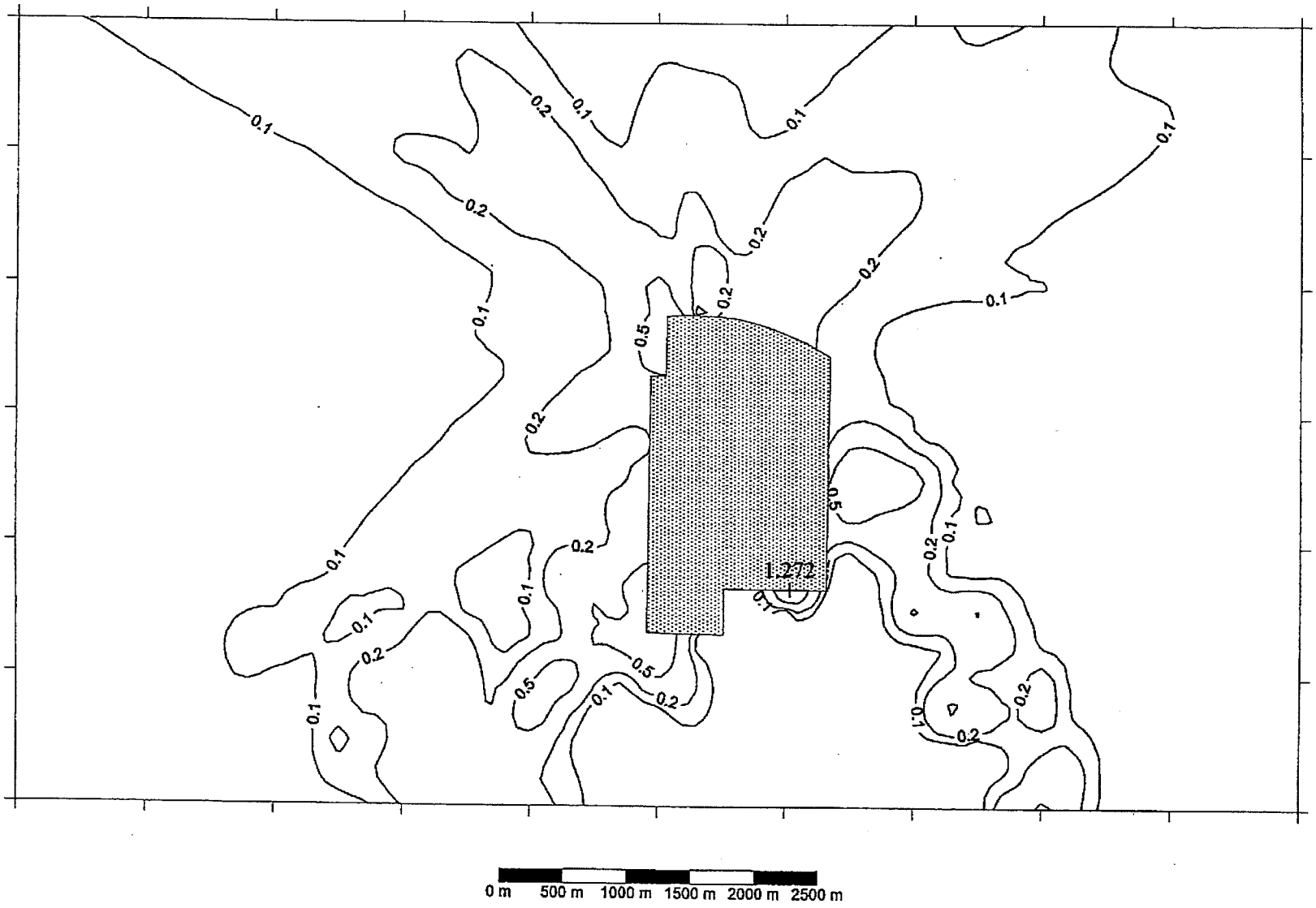




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**Table 3. Comparison of Maximum Predicted Concentrations with Ambient Air Screening Criteria**

| Pollutant | Averaging Period | #3 Maximum ($\mu g/m^3$) (1) | Screening Criteria ($\mu g/m^3$) |
|---|---|---|---|
| NO2 | Annual | 0.38 | 1.0 (2) |
| H2SO4 | 24-hour | 1.52 | 50 (3) |
| PM10 | 24-hour | 2.0 | 5 (4) |
| PM10 | Annual | 0.11 | 1 (4) |
| NH3 | 24-hour | 1.27 | 900 (3) |

1. Based on three years of AERMOD predictions and maximum allowable emissions.
2. PSD Significant Impact Level (SIL) for NO2. MFG conservatively assumes all NOx emitted is converted to NO2. Concentrations predicted below the SIL are considered insignificant for regulatory purposes.
3. IDEQ Acceptable Ambient Concentrations for toxic air pollutants.
4. Definition of Significant Contribution for PM10

**Annual NOx results.** The modeling analysis indicates predicted annual concentrations from #3 allowable NOx emissions are less that the Significant Impact Level (SIL) for nitrogen dioxide (NO2). Note, MFG conservatively assumes all NOx emitted is converted to NO2. Concentrations predicted below the SIL are considered insignificant for regulatory purposes and #3 allowable NOx emissions would not significantly contribute to concentrations in excess of the NAAQS. Maximum NOx concentrations potentially occur during light winds and stable conditions on the elevated terrain southeast of the facility as shown in Figure 5. A secondary annual maximum also occurs downwind of #3 in the prevailing wind direction.

**Toxic air pollutant results.** Maximum H2SO4 and NH3 concentrations predicted from #3 are shown in Figure 6 and Figure 7, respectively. The highest 24-hour concentration predictions also occur in elevated terrain along the southern site boundary and on the hill southeast of the Don Plant, near Site 7. The predicted maximum concentrations are much less than the IDEQ Acceptable Ambient Concentrations for H2SO4 and NH3.

**PM10.** If all sulfate were emitted as ammonium sulfate PM10 rather than acid mist, 24-hour average ambient concentrations would be distributed in the same pattern as the predicted acid mist concentrations (Figure 6). However, concentrations would be approximately 1/3 higher because the molecular weight of ammonium sulfate is greater than that of acid mist by the ratio of 132:98. The 2 $\mu g/m^3$ predicted maximum concentration is 40 percent of the 5 $\mu g/m^3$ 24-hour threshold for a significant contribution.



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If all sulfate were emitted as ammonium sulfate PM10 rather than acid mist, the annual average ambient concentrations would be distributed in the same pattern as the predicted NOx concentrations (Figure 5). However, concentrations would be only 28 percent of predicted NO2 concentrations because the potential PM10 emissions are much lower than potential NOx emissions. The 0.11 $\mu g/m^3$ predicted maximum concentration is 11 percent of the 1 $\mu g/m^3$ annual threshold for a significant contribution.

This assessment indicates the project would not significantly contribute to 24-hour or annual average PM10 concentrations even if all sulfate in acid mist were converted to particulate ammonium sulfate.

**Summary**

MFG conducted a dispersion modeling analysis to support a PTC application for the 300 Sulfuric Acid Plant Replacement Project at the Don Plant. Restoration of the facility could result in increased NOx, H2SO4, and NH3 emissions. MFG assessed emissions from the restored #3 by comparing predictions from the AERMOD model to the NAAQS and to IDEQ Acceptable Ambient Concentrations. The dispersion modeling analysis used a three-year meteorological database, a receptor grid mesh size of 250-m, receptors inside FMC's neighboring site, terrain elevations from USGS quadrangles, and modeling assumptions appropriate for the land use surrounding the facility. MFG's analysis indicates emissions from the restored #3 would not cause or significantly contribute to a violation of the NAAQS. Concentrations from #3 emissions of H2SO4 and NH3 were also found to be less than the IDEQ Acceptable Ambient Concentrations.



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J.R. SIMPLOT COMPANY

DON PLANT

PERMIT MODIFICATION

NO. 2

**300 SULFURIC ACID PLANT**

**FUGITIVE EMISSIONS**

June 28, 2006

AgriBusiness

J.R. SIMPLOT COMPANY P.O. BOX 912 POCATELLO, IDAHO 83204
(208) 232-6620 PLANT

June 28, 2006

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1410 N. Hilton
Boise, Idaho 83706

RE: J.R. Simplot Co. – Don Plant - Pocatello, Idaho – Request for Minor Permit Modification – TIER I OPERATING PERMIT No. T1 – 040313 – Permit Condition 16.7.2 – 300 Sulfuric Acid Plant

Mr. Pitman:

The J.R. Simplot Company, Don Plant, is submitting the enclosed information to meet minor permit modification procedures set forth at IDAPA 58.01.01.383. This is a "REQUEST FOR MINOR PERMIT MODIFICATION". This request for minor permit modification addresses the following Permit Condition in the Tier I Operating Permit:

Permit Condition 16.7.2.

Permit Condition 16.7.2 pertains to visible fugitive emissions at the 300 Sulfuric Acid Plant. Simplot appealed the inclusion of this permit condition in the Tier I Operating Permit Issued December 24, 2001. In response to that appeal item DEQ stated in part "Permit Condition 2.4 adequately addresses the compliance demonstration for fugitive emissions. However, the condition comes from PTC No. 077-00006, issued June 15, 2001, for the No. 300 Sulfuric Acid Plant so it cannot be removed from the Tier I permit until it is removed from the PTC. Simplot may request a PTC modification to remove the condition."

In this correspondence, Simplot is submitting a Request for Minor Permit Modification to remove Permit Condition 16.7.2 from the Tier I Operating Permit. The underlying permit condition is established in a supporting Permit to Construct. A Request to Revise Existing Permit to Construct is also being submitted in this correspondence to modify the requirements established in the underlying permit to construct. The following Exhibits are provided to address the permit modifications:

Exhibit I **Request for Minor Permit Modification**

| | | |
|---|---|---|
| Permit Condition | 16.7.2 | 300 Sulfuric Acid |

Exhibit I – A **Request to Revise Existing PTC**

| | | |
|---|---|---|
| Permit Condition | 2.3 | Final Permit to Construct, P-000318 |

IDAPA 58.01.01.383 describes the procedures to follow to address MINOR PERMIT MODIFICATIONS. IDAPA 58.01.01.209.04 describes procedures to follow to address REVISIONS TO PERMITS TO CONSTRUCT. The submittal of these documents initiates the modification process for the identified permit conditions.

Please contact me or Bob Willey at 208-234-5352 if you have any questions associated with this submittal.

Sincerely,

Leon Pruett
EH&S Manager
J.R. Simplot Company
Don Plant
208-234-5470

EXHIBIT I

J.R. SIMPLOT COMPANY

DON PLANT

MINOR PERMIT MODIFICATION

TIER I OPERATING PERMIT NO. T1 - 040313

ISSUED NOVEMBER 08, 2005

**FUGITIVE EMISSIONS – 300 SULFURIC ACID PLANT**

June 28, 2006

J.R. Simplot Company, Don Plant, Pocatello, Idaho
Air Quality Tier I Operating Permit No. T1 - 040313
Request for Tier I Permit Minor Modification

The J.R. Simplot Company, Don Plant, (Simplot) is submitting a "REQUEST FOR MINOR PERMIT MODIFICATION" of the Air Quality Tier I Operating Permit No. T1 - 040313 issued November 08, 2005.

Simplot filed an appeal on January 21, 2003 of the Tier I Air Quality Operating Permit issued by the Idaho Department of Environmental Quality (DEQ). Appeal Item 19 stated fugitive emissions evaluations for the 300 Sulfuric Acid Plant are not necessary. The IDEQ review and proposed changes to Appeal Item 19 follow: "Permit Condition 16.7.2 requires that visible emissions not be observed leaving the property boundary for a period or periods aggregating no more than three minutes in any 60-minute period and that visible emissions be determined using EPA Reference Method 22. Permit Condition 2.4 adequately addresses the compliance demonstration for fugitive emissions. However, the condition comes from PTC no. 077-00006, issued June 15, 2001, for the no. 300 sulfuric acid plant so it cannot be removed from the Tier I permit until it is removed from the PTC. No changes were made to the Tier I permit at this time. Simplot may request a PTC modification to remove the condition."

This submittal provides the information required for a minor permit modification to the Tier I Operating permit. A separate Request to Revise an Existing PTC will be provided as Exhibit I A in this submittal.

The proposed permit modification meets the requirements at IDAPA 58.01.01.383 for MINOR PERMIT MODIFICATION

300 Sulfuric Acid Plant

Fugitive emission requirements are identified in the Existing Permit Conditions listed below. Those permit conditions are based on requirements set forth in the underlying permit to construct for the 300 Sulfuric Acid Plant issued June 15, 2001. That permit is referenced as Permit Number 077-00006, J.R. Simplot Company, Don Plant, Pocatello, Idaho (Final Permit to Construct for the 300 Sulfuric Acid Plant Restoration Project, P-000318). Proposed Permit Conditions listed below state modifications to existing permit conditions.

A Request to Revise an Existing PTC to support this Minor Permit Modification Request will be provided in Exhibit I – A of this submittal.

Existing Permit Condition

16.7.2 Visible fugitive emissions shall not be observed leaving the property

boundary for a period or periods aggregating no more than three minutes in any 60-minute period. Visible emissions from fugitive sources shall be determined by EPA Reference Method 22 as described in 40 CFR 60, Appendix A, or by a Department-approved alternative method.

Proposed Permit Condition(s)

16.7.2 Delete permit condition.

EXHIBIT I A

J.R. SIMPLOT COMPANY

DON PLANT

REQUEST TO REVISE AN EXISTING PERMIT TO CONSTRUCT

300 SULFURIC ACID PLANT

PERMIT TO CONSTRUCT NO. 077 – 00006
(P – 000318)

ISSUED

JUNE 21, 2001

**FUGITIVE VISIBLE EMISSIONS**

June 28, 2006

J.R. Simplot Company, Don Plant, Pocatello, Idaho
300 Sulfuric Acid Plant
Permit No. T1 - 040313
Request to Revise Existing PTC – Fugitive Visible Emissions

The J.R. Simplot Company, Don Plant, (Simplot) is submitting a "REQUEST FOR MINOR PERMIT MODIFICATION" of the Air Quality Tier I Operating Permit No. T1 - 040313 issued November 08, 2005. This submittal is a Request to Revise an Existing PTC to support the Request for Minor Permit Modification.

Simplot filed an appeal on January 21, 2003 of the Tier I Air Quality Operating Permit issued by the Idaho Department of Environmental Quality (DEQ). Appeal Item 19 stated fugitive emissions evaluations for the 300 Sulfuric Acid Plant are not necessary. The IDEQ review and proposed changes to Appeal Item 19 follow: "Permit Condition 16.7.2 requires that visible emissions not be observed leaving the property boundary for a period or periods aggregating no more than three minutes in any 60-minute period and that visible emissions be determined using EPA Reference Method 22. Permit Condition 2.4 adequately addresses the compliance demonstration for fugitive emissions. However, the condition comes from PTC no. 077-00006, issued June 15, 2001, for the no. 300 sulfuric acid plant so it cannot be removed from the Tier I permit until it is removed from the PTC. No changes were made to the Tier I permit at this time. Simplot may request a PTC modification to remove the condition."

For the 300 Sulfuric Acid Plant, the underlying fugitive visible emission permit condition is located at Permit Condition 2.3 of the Final Permit to Construct for the 300 Sulfuric Acid Plant Restoration Project, P-000318, Permit Number 077-00006. The following revisions to the Permit to Construct are required to modify the visible fugitive emissions evaluation requirement.

300 Sulfuric Acid Plant

Existing Permit Condition - PTC

2.3 Visible Emission Limits

Emissions from the #3 sulfuric acid plant stack, or any other stack, vent, or functionally equivalent opening associated with the #3 sulfuric acid plant, shall not exceed twenty percent (20%) opacity for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period as required by IDAPA 58.01.01.625 (Rules for the Control of Air Pollution in Idaho).

Visible fugitive emissions shall not be observed leaving the property boundary for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period. Visible emissions from fugitive sources

shall be determined by EPA Reference Method 22, as described in 40 CFR 60, Appendix A, or DEQ-approved alternative method.

Proposed Permit Condition(s) – PTC

2.3 Visible Emission Limits

Emissions from the #3 sulfuric acid plant stack, or any other stack, vent, or functionally equivalent opening associated with the #3 sulfuric acid plant, shall not exceed twenty percent (20%) opacity for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period as required by IDAPA 58.01.01.625 (Rules for the Control of Air Pollution in Idaho).

This change provides support to the Request for Minor Permit Modification. The change will result in no increase in emissions of any regulated air pollutant. Because of no increase in any regulated pollutants, Section 203 and 205 requirements have already been satisfied.

Since there will be no increase in emissions based on this request, Sections 209.01.c, 209.02.a, and 209.02.b do not apply.